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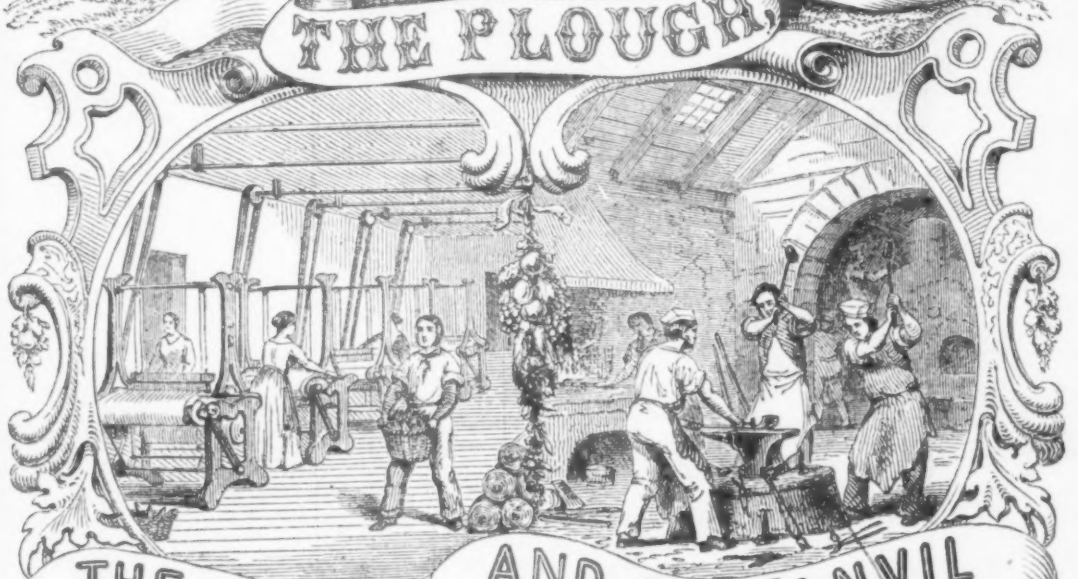

THE LOOM AND THE ANVIL

J. S. SKINNER, EDITOR.

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NOTICE.—L. G. Morris's Great Sale of Improved Domestic Animals takes place on the 24th inst. For further information see his Advertisement in this paper. Catalogues can be obtained at this office, or from Mr. Morris. If required to be sent by mail, the postage will be prepaid.

Any of the following agents are authorized to collect money or take subscriptions for the *Plough, the Loom, and the Anvil;* but we wish our subscribers to understand that this is not to prohibit them from remitting their subscriptions by mail to us direct. Indeed, we would much rather they would do so, thereby saving us heavy commissions; and we will take the risk of its coming safe:—

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The Plough, the Loom, and the Anvil.

VOL. III. JUNE, 1851. No. XII.

WHO PAYS THE DUTY—THE PRODUCER OR THE CONSUMER?

THIS is a question not unfrequently asked by those who desire to understand for themselves the working of the protective system, by means of which we seek to arrive at real and perfect freedom of trade.

It is now about four years since it was answered by the then Secretary of the Treasury in an elaborate report, in which the nation was assured that every ton of coal mined in the Union was sold at *one dollar and sixty cents more* than it would sell for under a system of perfect freedom of trade, althongh the average price of coal, at Pottsville, Mauch Chunk, Lackawanna, and Pittsburg, did not exceed *one dollar and fifty cents.* They were thus assured that the tax paid by the consumer was *more than the whole price* he paid for his fuel. The tax paid by the consumer of a ton of nails was set down, if we recollect rightly, at about ninety dollars, being nearly the whole price paid for them; and in this manner there was made up an exhibit of taxes amounting to about a hundred millions of dollars. The object had in view in making a statement like this was accomplished, and the tariff of 1846 was passed. How far it was entitled to have received even the slightest consideration, we hope to enable our readers to judge for themselves.

The prices of commodities in the general market of the world are, as our readers well know, dependent on the proportion which the supply bears to the demand—rising as the quantity diminishes, and falling as it increases. The rapid increase in the supply of cotton since the introduction of its cultivation into the Union has caused a great reduction in price. Let us abandon its cultivation, and it will then again command thirty or forty, if not even fifty cents per pound. With a large crop of grain, the price falls; with a small one, it rises. So is it with sugar, coffee, wool, indigo, and every other of the commodities required for the use of man.

Increase of supply tends thus to diminish the general price—diminution to increase it. If protection tends to promote increase of supply, it must tend, then, to produce diminution in the general market price, and that diminution constitutes an offset against the duty. If the diminution be equal to only a part of the duty, the remainder is paid by the consumer, against which he has to set off the profits resulting from bringing the market for his produce to his door, and the gain resulting from the power to restore the manure to his land, and from being enabled to apply labor that would otherwise have been wasted. If the diminution in the general price be equal to the whole duty, then the whole amount of duty falls upon the foreign producer, and the domestic consumer pays nothing, *while profiting largely by the domestic market furnished him by the men whose competition has compelled the reduction in the foreign price.*

In 1842 the domestic production of iron but little exceeded 200,000

tons, and there was reason to believe that it would speedily fall much lower. Five years afterwards, under the action of the tariff of '42, it had reached 800,000 tons. The quantity of iron in the general market of the world had been largely increased by the protection that had been afforded to the domestic producers, and to our increased power of production is unquestionably due the low price to which the foreigner is now compelled to submit, that he may obtain an entrance into our market. Abolish the existing duty, and we shall cease altogether to make iron, the consequence of which will be that the supply in the market of the world will be so greatly diminished, that the price will rise far more than the duty, and thus the foreign producer will pocket what the treasury ceases to receive. If so, it must be obvious that the duty is now paid by the foreign producer, and that the only effect that could result from its abolition would be that of transferring to the consumer the tax now paid by the producer.

In 1847 we consumed almost a million of tons, of which 800,000 were made at home. Had the tariff of 1842 remained untouched, we should now produce at home 1,250,000 tons. Were we to abolish all protection, closing the furnaces at once instead of doing it by degrees, as we are now doing, it would be necessary to import at least 1,100,000 tons to enable us to consume as much per head as we did in 1846–7. At what price could that quantity be supplied? Certainly not less than £10 per ton; and the cost delivered here, duty free, would not be less than $60. The abolition of all duty would thus inevitably raise the price, because it would diminish the general supply. Were we, on the contrary, to raise the duty to $20, the price *could not rise above* $50, because every furnace in the country would be re-opened, and the general supply would be largely increased; the effect of which would be to cause a diminution of prices in foreign markets, even below their present point, for while competition is maintained, the foreign producer *must* pay the duty.

Thus far our iron-masters have struggled to maintain competition, and the supply in the general market has been large, the consequence of which is seen in the present low prices. With another year the mass of the remaining furnaces will go out of blast, and then, the supply in the general market being greatly reduced, the price will rise to a point so high as greatly to diminish consumption, for we certainly cannot pay for even half a million of tons of foreign iron at a cost of $60 a ton. The choice presented to us for consideration appears to us, then, to be this:—

First. To abolish the duty altogether, and close at once all our furnaces, importing from abroad our whole supply at a cost, including freight and charges, of sixty dollars per ton.

Second. To maintain our present system, closing our furnaces by degrees, and thus diminishing the supply to a point at which prices abroad will rise to £7 10s. or £8, and the consumer will pay $50, until the next period of speculation, when he will pay $60 or $70, if not $80.

Third. To raise the duty so as to afford real protection, enabling the consumer to obtain his iron now at $50, with a certainty of its reduction to $40, or even less.

In the first case, the consumer will pay $60, and the treasury will receive nothing. In the second, he will pay $50, and the treasury will receive $10. In the third, he will now pay no more, and the treasury will receive $20.

That this view is the correct one, we entertain no doubt. The question we have undertaken to answer will, however, be answered for himself by each and every one of our readers, after giving due consideration to the following:—

At what price *can* we be supplied from abroad with 1,100,000 tons of iron, freight and charges paid, and duty free? *Can* it be less than $60?

At what price *must* our iron-masters supply us with the same quantity, under a duty sufficiently protective (say $20 per ton) to open all the furnaces of the Union? *Can* they, under existing circumstances, obtain the market at more than $50 per ton?

Having answered these questions, as we feel assured they must, in the negative, we would then ask our readers to determine, if they do not settle the question that it is the foreign producer of iron that pays the duty, and if the consumer is not, under the protective system, supplied at a cheaper rate than he would be were all protection abolished?

It may, perhaps, be asked, "If prices rise abroad, will not our old furnaces be re-opened, and will not new ones be built?" In answer to this we have to say, that when the furnace-master has been ruined, and his furnace has been transferred by the hands of the sheriff, the power to re-open it does not not exist. Abolish the tariff, and we hazard little in saying that there will not be found in the Union a single man willing to enter into competition with men like the British manufacturers, whose motto is, "Rule or ruin." We shall hereafter have occasion to exhibit speciments of the enormous extent of reduction that is submitted to, so long as there exists even a hope of ruining their competitors, and securing our market to themselves.

Among our readers there is not a single farmer that does not know that the cost of going to market falls on himself, the producer of the things for which a market must be sought. Give him a turnpike, and he saves part of the cost of transportation, the consequence of which is that his land rises in value. Give him a railroad, and it rises again. From day to day we see accounts of increase in the value of land resulting from the opening of roads, by means of which the cost attendant upon seeking a market has been diminished.

The first thing to be paid by land is transportation. When that is so great as to eat up the whole proceeds, the land will remain uncultivated. Diminish the cost of transportation so as to leave sufficient to pay the wages of labor, and it will be cultivated, but it will pay no rent. Diminish it further, so as to leave a surplus over and above the reward of the laborer, and the land itself will acquire value. Diminish it still further, by removing altogether the necessity for transportation, making a market on the land for all the products of the land, enabling the farmer readily to return to it all the refuse of its products, and it will acquire the highest value of which land is capable. The increased price paid for land wherever roads are made, or being made, is an admission on the part of those who purchase, that the expense of getting their agricultural products to market falls upon and is paid by the producer, who has to bear the cost of transportation, and, as a part of it, any duties levied at the toll-gates on the way.

The only difference between the raw material—the first rude product of the land—and the same material transformed and combined with others in the shape of manufactured fabrics, is, that in the production of the former there is universal competition. When we subject foreign

manufactures to duties, with a view to the production of domestic competition, the law applies in all its force; and the foreign producer must get to market at his own cost, paying all the tolls and duties out of his own pocket. When it is not so, whenever the consumer has to go away from home for the articles he desires to purchase, he pays his own expenses, the cost of transporting the raw material which he brings to exchange, and that of carrying back with him the cloth or iron he obtains in payment, as well as the duties levied upon them. Whether we are right or wrong in these views, let the facts answer.

A quarter of a century since we mined scarcely any coal, and the price of foreign coal was then eight or ten dollars per ton. In 1842 we mined a little more than a million of tons. In 1847 the quantity had reached three millions of tons, and the selling price was less than half what it formerly had been, and yet the quantity imported was five times as great. It is thence obvious that the foreign producer had reduced his price to conform to the American one.

In 1842 the duty was twenty per cent., being perhaps seventy cents per ton, and we then imported 141,000 tons. In 1846 the duty was $1 60, and we then imported 156,000 tons. The selling price having remained nearly the same, it is clear that the foreign producer carried back with him just so much less per ton as the duty had been increased—that is, that he had paid the additional duty.

The quantity of coal in the general market of the world has been largely increased by aid of protection, and hence it is that prices have fallen. Let us now suppose the tariff totally repealed, and protection abolished, and see what would be the effect. It is clear that the foreign producer was willing in 1846 to sell at our market prices, and pay the duty himself. The abolition of the duty would enable him, if he continued to sell at the same prices, to put into his pocket an additional $1 60 per ton; and if he reduced his price eighty cents, he would still receive eighty cents per ton more than he did before. Such a reduction would close half the coal mines of the country, and the closing of furnaces and cotton-mills would close the remainder. For a little time competition would be maintained, but as the foreign supply would steadily increase, and the domestic demand as steadily decrease, the inevitable effect would be to ruin every man and every company now engaged in producing coal for market.

At what price could we then purchase from abroad three million tons of coal, the quantity brought to market in 1846? Could we have it at $4—or $5—or even $6? We could not. Admitting, however, that we *could* have that quantity as cheaply as we now have it, let us inquire at what price we could have the five millions we should need this year, had not the tariff of 1846 closed our furnaces and our mills. The transport of that quantity would require about 1,250,000 tons of shipping, and freights would be high. The British coal owners, having the monopoly of the market, would fix the price, and that would be high; and the result would be, that to obtain five millions of coal would require from thirty to forty millions of dollars under a system of perfect "free trade;" whereas, under a system of perfect protection, the same quantity could be supplied for less than twenty millions. Who is it, then, that now pays the duty? When we see that the abolition of protection would put up foreign prices to an extent fully equal to the duty, is it not obvious that the duty is now

paid by the foreign producer, and constitutes a part of his cost of production? To us it certainly seems that such is the case.

In 1841–'2 we consumed little more than 300,000 bales of cotton. Five years after we consumed 600,000 bales. The supply of cotton cloth in the general market of the world had largely increased under protection, and the consequence was a great reduction of price, as we shall now show by aid of the tables appended to the Treasury Report of 1847:

	Merrimack blue prints.	No. 10 checks.	York colored cottons.	Drill-ings.	Chicopee sheetings.	Bartlett long cloths.
1841	13¼	13⅛	14	9½	8.62	12
1842	12	12⅛	12	8¼	7.08	10⅛
1843	11	11⅜	12	7⅞	7.37	10¼
1844	11	13¼	13⅛	8⅞	8.16	11⅛
1845	11¾	13¼	13	8⅛	7.67	10⅛
1846	11¼	12½	12¾	8¼	8	10

The total repeal of the tariff would close every mill in the Union. Many may doubt this, yet such would be the fact, although we can now manufacture heavy cottons at lower prices than any people in the world. The first effect of such a measure would be to close the furnaces and the mines, the woollen mills and the hatters' shops, and thus diminish the market for cottons. The discharged workmen would be unable to purchase their usual supplies of food, and thus the power of the farmers to purchase cloth would be reduced. The price of cotton would fall heavily, and the power of the planters to purchase clothing would be reduced. The price of wool would also fall heavily, and the power of the wool-growers to purchase cloth would be reduced. With this immense diminution in the domestic market, there would be an immense increase in the supply from abroad, and the result would be, as we have said, to close every mill in the Union, north or south, east or west, not to be re-opened until wages should have fallen to the European level, if even then, which we deem most unlikely.

The effect of this would be to diminish immensely the supply of cotton cloth in the market of the world, and thereafter to raise its price so greatly that consumption would fall to less than 200,000 bales. At what price could we be supplied with the 600,000 bales of cloth we now make? Could it be done at an advance of fifty per cent. on the present prices? It certainly could not. Is it not, then, obvious that the way to raise prices is to abolish protection, and relinquish to the English manufacturer the entire control of the markets of the world, for which he is now contending, and thus enable him, the foreign producer, to put into his pocket the sum that he now pays into our treasury; and that the way to lower them is to afford that perfect protection which will cause the re-opening of the mills now closed, and the building of new ones throughout the South and West, and thus increase the supply of cloth in the general market of the world? With us there is not a shadow of doubt as to the true answer to be given to this question.

To our cotton-growing friends it is one of serious importance. It is time that they should rid themselves of the errors resulting from the idea of incidental protection, and examine for themselves what would be the effect of an entire repeal of the whole tariff system, and the establishment of perfect free trade, as it is the fashion to call the maintenance of the English monopoly system. If such an examination should, as it would, result in satisfying them that under such a system the domestic manufacture of

cotton goods would be here as impossible as it now is in Ireland, Canada, or India, let them then reflect what would be the price after Great Britain had re-established her monopoly of our market, and then determine for themselves who it is that now pays the duty. Having so done, let them seriously ask themselves for an answer to the question: "Is there any road to perfect freedom of trade except that which leads through perfect protection?"

In 1841–'2 we consumed about *fifty* millions of pounds of wool. It is somewhat doubtful if it was even so much. Four years after, our consumption exceeded *eighty* millions. The effect of this increase in the supply of woollen cloths in the general market of the world was a universal reduction of price, as may here be seen:—

	Hamilton broadcloth, 4th quality.	Hamilton broadcloth, 6th quality.	Middlesex cassimeres.	Blue satinets.	Andover flannel.	Brown M. de Laines.
1841	$2 75	$2 25	$1 70	71c.	27c.	
1842	2 50	1 87½	1 50	62	20	
1843	2 25	1 87½	1 50	52	23	15cts.
1844	2 35	2 00	1 40	70	30	13
1845	2 37	2 00	1 35	70	26	13½
1846	2 25	1 70	1 30	60	24	12

	Cotton and Wool Linseys, white.	Fine Carpetings.	Army Clothing.
1841	22cts.	70cts.	$2 48
1842	20	65	2 43
1843	20	62½	2 19
1844	20	67½	2 30
1845	24	65	2 22
1846	21	65	2 10

It is clearly obvious that with the increased production the domestic price had greatly fallen, and that the foreign producer was paying *a larger sum in the shape of duty*, out of a *diminished gross receipt*. He, certainly, was here the payer of the duty. If not, who was? Certainly not the consumer, for he was, under a system of efficient protection, obtaining his cloth cheaper than he had ever done. Protection had certainly thrown the payment of the duty on the foreign producer.

Let us abolish protection, and see what will be the result. It will close every woollen mill in the Union, and then we shall need to go abroad for eighty millions of pounds of woollen cloths. What, then, will be the price? Will it not advance rapidly, as the supply is diminished? Unquestionably it will, and the result will be, that while the treasury will receive nothing, the consumer will pay as high a price as formerly.

It is a common idea that prices abroad have a natural tendency to fall, and that they would fall whether we manufactured or not. How far this is correct, may be seen by an examination of the following prices of articles which we do not manufacture, and for which we are wholly dependent upon Europe:—

	Closet locks per doz.	Wrought iron pans per lb.	Vises per lb.	Files, 12 in. per doz.	Hollow wares, discount.
1839.....	$1 56	7.7	5¾	$3 33	p. ct. 47½
1840.....	1 36	7.7	5¼	3 33	47½
1841.....	1 26	7.7	5¼	3 13	47½
1842.....	1 17	7.7	5¼	3 13	50
1843.....	1 04	7.7	5¼	3 13	55
1844.....	1 53	7.7	5¼	3 13	
1845.....	1 53	8.2	5¼	3 35	50
1846.....	1 56	8.4	5⅜	3 35	50
1847.....	1 56	7.7	5¼	3 20	50
1848.....	1 26	7.7	5¼	3 20	50
1849.....	1 17	7.2	5¼	3 13	50

Bajou's Paris kid gloves, which from 1839 to 1841 were at 25 francs per dozen, have *advanced* in the period that has since elapsed to 26, 27, and 28 francs, at which latter price they sold last year. In the same period there has been no change in silk goods, except as they have varied from the abundance or the scarcity—the low or the high price—of the raw material. An extensive importer of French china informs us, that in the last ten years the reduction of price has not equalled *one per cent. per annum*. Let this be compared with the reduction that has taken place in all the articles which, *by reason of the grant of adequate protection*, are extensively made in this country, and then let it be determined who it is that pays the duty.

In 1843 the export from England of tin plates was 300,000 boxes, at 26s. 6d. ($6 36) per box. In 1850 it was 800,000 boxes, at 36s. ($7 92) per box, for the same quality. Here is an additional charge of $1 56 per box, which upon 800,000 boxes amounts to a tax of $1,250,000, paid by the consumers of tin plates, because of the monopoly power exercised by Great Britain. It would be well if some of the advocates of the British monopoly system would explain why it is that all the articles we cannot or do not manufacture maintain their price, or even rise, while all those we protect, and therefore do manufacture, fall so much in price that they are invariably cheaper under the high duty than they had been under the lower one. That done, they will be enabled to explain to the farmers and planters who it is that really pays the duty, and how much is the true amount of taxation they are now paying for the maintenance of the British system.

The only circumstance that *can* cause reduction of price is competition, producing an increased supply in the general market of the world; and where that competition does not exist, there is little or no tendency to reduction. Whence is that competition to come? From the countries that have free trade with England—from Ireland, Canada, India, or Portugal? Certainly not. Not only can they not produce, but they are unable even to consume. Whence, then? The answer is to be found in the fact that the only competition with England is to be found in Belgium, which maintains protection—in the *Zoll-Verein*, which maintains protection—and in this country, which did for a time grant efficient protection, but now grants that which is inefficient, and calls it revenue duties.

Prior to the establishment of the *Zoll-Verein* the consumption of cotton by Germany was trivial. It is now immense, and rapidly increasing, and she exports her products to every part of the world, *because protection has made them cheap*. Sheffield now complains that, instead of exporting cutlery *to* Germany, she now is *undersold by Germany* in

every market of the world. Leeds complains that she is undersold by both Belgium and Germany, and Manchester complains that protected America undersells her even in India. If protection raised prices on the consumer, such things as these could not happen.

We have before us a statement of the movement in regard to the prices of pins, that illustrates so fully the payment of the duty by the British producer, that we desire to call to it the attention of our readers :—

	Pins No. 4.	Mixed pins.
1835	1 12½	
1836	1 04	
1837	85	
1838	80	
1839	80	45
1840	80	45
1841	75	45
1842*	62½	40
1843	55	35
1844	50	35
1845	45	35
1846	42½	32

We see here the foreign producer steadily reducing the price, and thus taking upon himself the payment of the duty, until at length it leaves him so little that he is compelled to abandon the contest, and from that moment the price diminishes still more rapidly than before. In the six years following 1836, the reduction was but about twenty per cent.; whereas, in the four pears following 1842, it was above thirty per cent. Let us repeal the duty, and close our pin factories, and we shall speedily see the price back to the point from whence it started in 1836, and then we shall have it conclusively determined who it is that now pays the duty.

It is the payment of these and other duties that is now ruining England. Germany and the United States were her largest customers, but both have resorted to protection; and the consequence is, that the British monopoly is rapidly passing away. The supply of cotton and woollen cloth, of iron and manufactures of iron, and of various other commodities, in the general market of the world, has rapidly increased, the consequence of which has been a general fall in the prices of every thing in which competition has been thus established. The *increase* of duties on importation into both Germany and this country having been attended with *diminution* of the market prices in both, it has followed that the British manufacturer has been compelled to pay the higher duty out of a diminished price, the result of which has been that British prices have been driven down to so low a point that the wages of labor have been considerably diminished, while much of her capital employed in the manufactures has yieded no profit whatever. Nevertheless, Britain is determined, at whatever sacrifice, to be "the workshop of the world," and the ruinous game in which she has so long been engaged appears likely to be fairly played out. From year to year her power of purchase diminishes, and, since she determined upon sacrificing her agriculture, in the hope of inducing other nations to release her from the payment of the duties by which their governments are maintained, her decline has been more rapid than at any former period. She has yearly more peo-

* Here importation ceased.

ple to feed and clothe, and yearly a less amount to do it with; and yet it is for the purpose of obtaining the privilege of feeding and clothing these people—a large portion of whom never see animal food, and never purchase a new article of clothing—that our farmers and planters have been called upon to forego the advantage of making a market on the land for the products of the land, by bringing to their sides prosperous consumers, able to purchase abundant supplies of both food and clothing.

The radical error of the ad valorem system, as it now stands, is, that it fixes only the *proportion* of the Government, leaving the *quantity* to be fixed by others; thus making it the interest of all who deal with us to undervalue their goods, for the purpose of defrauding the treasury, and thus throwing on the consumer the payment of the duty. The Government must be supported, and whatever is not paid by the foreigner, must be paid by ourselves.

Had *prices* been determined at the same time that proportions were fixed, the *quantity* to be received by the Government would have been an uniform one, and all the grievances to which we have called attention would have been prevented. It would then have been easy to graduate the proportions so as to meet the demands of the Government, raising the rate of duty if more revenue were needed, or depressing it if more were raised than was required.

The English manufacturer himself fixed the price of vises *in our market.* He was willing to place there one hundred pounds for the sum of $5 25, out of which he paid the duty, whether high or low. He placed hollow ware there at a discount of fifty per cent., paying himself the low duties of 1841–'2, the high ones of 1843 to '46, or the medium ones of 1848–'9.

Let us suppose the prices to have been then so fixed, and see what would then have been the effect on domestic competition. The sum paid by the foreigner would have been $1 57½, and it would be payable on every one hundred pounds imported, whatever the price at which the foreigner might see fit to invoice his goods. The Government would not have found itself leagued with him for the destruction of that competition which can alone destroy monopoly and establish freedom of trade. It would, in effect, have said to him, "You have fixed the price at which you are willing to supply your goods, and we have fixed the proportion of that price which *you must pay* into our treasury. We will not increase that proportion for the purpose of aiding our own citizens to drive you out of our market, but, on the other hand, we will not reduce it to enable you to ruin him. Ruin him if you can. Our policy is non-interference. We believe that freedom of trade and reduction of prices will be promoted by competition, and we are not favorable to the idea that we should aid you in the destruction of our enterprising citizens who desire to establish here new modes of industry."

The market prices of 1846—the period at which the present tariff became a law—were those at which England was willing to supply us with cloth and iron, and out of those prices she herself paid the duty; and to permit her to pay less than she then paid was to transfer to our own shoulders the burden which we then decreed she should carry—to make the consumer pay what was intended to be paid, and was then paid, by the producer. Had those prices been established, the Government would have

placed itself in a position of non-interference between the foreigner and our own citizens. By not establishing them it has made itself the ally of foreigners in a most destructive warfare on our own people, and in a war against morals, by offering a bounty on perjury and fraud. By now correcting the error then committed, we shall accomplish four great objects: first, that of ridding ourselves of a system of fraud; second, that of enabling the Government to determine for itself the quantity that shall be paid; third, that of replacing the payment on the shoulders of the foreigner, to whom it properly belongs; and, lastly, and most important, the Government will cease to lend its aid to that foreigner in his efforts to crush our own citizens for the purpose of maintaining a monopoly, the direct effort of which is to compel us to give for his commodity far more food, cotton, or tobacco than we should have to give were competition once fairly established.

It has been seen, that notwithstanding great changes of our revenue system, the market price of articles in which we *do not* maintain competition has remained almost unaltered. Thus, in 1842, under a mere revenue duty, vises sold at $5 25 per hundred pounds, and the discount from the list of prices of hollow ware was fifty per cent. In 1843 and 1844, the price of the one and the discount of the other were precisely the same. It is clear that the producer here paid the difference, and that *the effect of raising the duty was to throw it upon him.* In 1848 and 1849 the prices and discounts were precisely the same as in 1842, although the duty was one half higher. From this it would appear that the true mode of throwing the duty on the consumer is to lower the rate, and that the true mode of putting it upon the producer is to raise it; and that the chief question to be settled is, whether the foreign manufacturer shall have a large share of the market price and the treasury a small one, or the former a smaller and the latter a larger one. The consumer appears to have his commodity at the same price, whether two, three, or four tenths of it go into the public coffers; and thus it is that by protection the means for supporting the Government are made to be furnished by foreigners, whereas, under what is called a revenue system, they must be supplied by ourselves.

We may now look to the working of the *ad valorem* system, with a view to see how far it tends to throw the maintenance of Government upon foreigners or upon ourselves—and how far it tends to maintain, or to destroy, the competition which is essential to that perfect freedom of trade which it is the object of Whig policy to bring about.

We have seen that, owing to deficient protection here, England has thus far been enabled to maintain her monopoly of the supply of vises and hollow ware. We have also seen that *our* market prices remain unchanged under various rates of duty, the *foreign* price being adjusted to meet the greater or less demands of the treasury. Let us now suppose an enterprising citizen to undertake the manufacture of those articles, and see what would be the effect. The foreign manufacturer would at once reduce his prices ten per cent. in hopes to crush the infant enterprise, *and the Government would step in to aid him by a corresponding reduction of duty,* so that the total fall would be thirteen per cent. If that failed to answer the purpose, there would be a foreign reduction of twenty per cent., to which the Government would add six, making a total of twenty-six. At the next step it would be thirty, to which the Government would

add nine, making thirty-nine in all; and at the following one it would be forty, with an addition by the Government of twelve, making in all fifty-two; and the result of this combined effort of the foreigner and the Government would probably be, this time, the accomplishment of the object in view—the annihilation of competition, and the re-establishment of perfect monopoly; after which prices would go back to the point from whence they started. During all this time the consumer had *gained* by the reduction, but he had *lost* as a citizen, because of the relinquishment by the treasury of so large a portion of its dues; but with the close of the competition he would cease to gain, and would do so precisely because the treasury had not continued to collect the same amount of contribution from the foreigner. Had the duty been specific, the treasury would have taken always the same sum, and the whole would then have been paid by the producer, who would have been unable, unassisted, to destroy his competitor; whereas, under the *ad valorem* system, the treasury had divided with the foreigner a loss incurred for the express purpose of breaking down domestic competition, and thus throwing on the consumer the whole burden of the duty.

Four years since, the lowest price at which England would supply us with iron was £10, and the duty being fixed at thirty per cent., its amount was $14 40. The rapid growth of our iron manufacture bid fair speedily to shut her out of our market, and she has incurred great sacrifices with a view to avert this catastrophe. The price fell to £8, and the Government contributed one fifth of the duty towards the accomplishment of the good work of ruining our own owners of forges, furnaces, and rolling mills. Again the price fell, and again the Government made a contribution. It is now supplied at less than £5—*being far less than the actual cost of production*—and the Government contributes about $7 50 per ton, in reduction of duty, to enable the foreigner to keep up the murderous warfare that appears destined to result in the entire ruin of a branch of industry quite as important to the country as the culture of cotton, almost equal to it in amount, and that was growing with a rapidity never equalled in any department of industry in any country of the world.

It is the first time in the history of the world that any Government has made its whole revenue system dependent entirely on papers prepared abroad—and the first, as it is likely to be the last, that a Government has been seen leagued with foreigners for the destruction of all its men of activity and enterprise.

It is, too, the first time in the history of the world that a body of intelligent farmers and planters, recognizing by their actions that they it is that *must* pay the cost of going to market with their products, have aided in the maintenance of a policy having for its object the infliction upon them of a necessity for going to a distant market when they might have a near one.

Potato Rot.—The reward of $10,000 offered by the Legislature of Massachusetts for the discovery of a cure for the potato rot, has been claimed by Mr. Joshua F. Hatch, of Dorchester. His remedy consists of ground charcoal mixed with sulphate of lime.

At present prices, we can well afford to dress potatoes with any amount of plaster and charcoal; but we doubt the efficacy of Mr. Hatch's remedy. The cause of the disease, Mr. Teschmaker thinks, is atmospheric, and he is probably on the right track. Try the coal dust and plaster, however; it costs little, and experiments are not only interesting, but frequently lead to great results.

ON THE CULTIVATION OF TOBACCO.

[*Continued.*]

OF THE CUTTING, CURING, AND HOUSING.

We have now arrived at the most difficult and critical stages of the whole process, every operation, from this time until the plant is cured, requiring great attention and care, as well as skill and nicety of judgment in the execution. And hence a great contrariety of practice in some of the minutiæ prevails, according to the superior skill and ability of different planters.

It is difficult to convey an idea of ripe tobacco by description. It can only be learned by observation and experience. In general, its maturity is indicated by the top leaves of the plant turning down and often touching the ground, becoming curdled with yellow spots interspersed on their surface, looking glossy and shining, with an entire loss of fur, a manifest increase of thickness in the substance of the leaves, which, when pinched in a fold between the finger and thumb, will crack or split with ease. But the most experienced planters acknowledge that they are more apt to err in cutting their tobacco too soon, than in deferring it too long. As a proof of this, take two plants growing side by side, of equal size and appearance in every respect, and both apparently ripe; cut one and weigh it both green and when cured; let the other stand a week longer, and when weighed like the first, the difference in favor of the latter will be astonishing. If it be asked, why we do not avail ourselves of the advantage to be derived from thus deferring the operation; it may be answered, as I have before observed, that tobacco while standing is liable to be injured and destroyed by more accidents than any other plant, such as hail-storms, heavy rains, high winds, the depredations of worms, the growth of suckers from the root, which abstract greatly from the weight and thickness of the leaves if suffered to grow, and which it is not always convenient to pull off. Besides this, the season of cutting tobacco is a very busy one to the planter, and too much work would accumulate on his hands by deferring it to the last moment. For these reasons it is considered most prudent to cull out the plants as soon as they will make good tobacco, in which case the loss in the aggregate amount of crop is balanced by avoiding the risk of accidents, and being able to bestow more care and attention to what remains.

The cutters go over the ground by rows, each taking two at a time, and the plants they cut are laid in the intermediate row between them. This facilitates the picking up, as the cutting of four rows is thereby placed in one. The stalk of the plant to be cut is first split down with the knife about six inches, and after being cut off just below the bottom leaf, is inverted and laid upon the ground, to fall and become pliant for handling. The splitting of the stalk is important, both for the convenience of hanging it on sticks, and accelerating the cure of the plant. To those unused to the culture and management of tobacco, it will be almost incredible to learn how soon it will *sun-burn*, as we call it, after being cut and turned over on the ground. This is effected by the hot rays of the sun piercing and penetrating the tender parts of the leaves, and is manifested by the parts affected turning white, and soon becoming dry and crisp, and, when cured, of a dark green color, without possessing any of the strength or qualities of tobacco. In very dry, hot weather, sun-burning often takes place before a large plant falls sufficiently to be handled without breaking off the leaves; and for this reason the cutting in such weather should always be made early in the morning, and not proceed after ten o'clock. Sometimes it is done in the evening, when there is no prospect of rain, by which the packing up may be accomplished earlier the next morning, and with less risk of burning. As soon as the plants fall sufficiently to handle without breaking off the leaves, they are *hand-fulled*, as we call it; that is, they are picked up, and three, or four, or five plants are laid together, with their tails from the sun, and the stalks inclined and somewhat elevated against the sides of some of the hills. The pickers up, after going through this ground, return and turn over each handful, that both sides of the plants may receive the benefit of the sun, and not be burnt: and this operation is again repeated, if by this time the tobacco is not pliant enough to be put in *shocks*. This is putting an indefinite number of handfuls together, the stalks in an erect position, forming a sort of circle of any diameter, from two to six feet or more, at convenient distances in the field; and these shocks should be im-

mediately and effectually covered with green bushes, or something else, previously in place, for the purpose of excluding the rays of the sun.

The next operation (after the heat of the sun has declined) is to remove the tobacco to the house or scaffold, and hanging the plants on sticks four and a half feet long, and about one inch square.* The common pine affords the best timber for this purpose, which will rive straight and with ease. From ten to twelve plants, according to size, may be hung on each stick, the width of two fingers to be left between each plant. The scaffolds are raised four or five feet from the ground, and the poles to receive the sticks are placed four feet apart, and are made to range east and west, so that the sticks will be north and south, to give both sides an equal benefit from the sun. The tobacco is commonly removed from the field to the house or scaffold upon the shoulders of the laborers, carefully put on and taken off to avoid bruising; but if the distance is great, carts are used, greater care being necessary to avoid bruising. This is considered so important, that some judicious planters make temporary scaffolds in the field, preferring the risk of injury from a smart rain to that of bruising, by moving it far in a green state.

There are two modes of curing tobacco: one in the house, altogether by fire; the other by the sun on scaffolds. The first is esteemed the best and most effectual, but it is attended with great risk. Our houses are generally four-sided pens, twenty feet square, built of round poles, and about twelve feet pitch. The joists are placed four feet apart, the rafters immediately over them having beams corresponding with the joists, three feet perpendicular from each other, so as to afford ranges or tiers for the tobacco up to the crown; and the same tiers are fixed below

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* SENDING "HOME" TO ENGLAND.

It was the custom formerly, as will be seen in Smith's History of Virginia, to "*send home*" *for cords to tie the tobacco on the sticks.* It was then left to the mother country to prescribe, not only the number of plants in relation to the number of hands on the plantation, but *she* regulated actually the *number of leaves* to be left on the stalk when it was *topped.* Topped "with the thumb nail," Totham says in his Treatise, "hardened in the candle for that purpose," and "not *for the use of gouging out people's eyes, as some have thought proper to insinuate.*"

It is true that, as far *as her interest is promoted by it*, we have cut loose from the *cords* of colonial vassalage. If she had continued to regulate the number of plants and of leaves, it is not likely we should now send her as much as enables her to levy on our tobacco alone some $16,000,000 a year! But how much less preposterous is it to send to her for iron and cloth, (the elements of which so much abound in Virginia,) than it was to send for cords to tie on our tobacco? Were it not for party spirit, that, like a Gorgon, petrifies men's minds, and turns their very thoughts into stone, Virginia would as soon think of sending to England for flour and beef in the *barrel*, as in the shape of the iron and other things in which she is importing them. Old prejudices, like the old oaks rooted in colonial times, may still linger for a while; but must finally disappear before a clearer perception of what real independence means. The truth *is* almighty, and it must prevail.

"Occulari potest ad tempus veritas, vinci non potest."

We sometimes wonder that the heavier contributions she levies upon the United States, by the augmented sales of her manufactures—the consequence of our increased power of consumption, arising from our *quasi* independence and partial protection, precarious and uncertain as this is—we wonder, we say, that the greater benefit she derives by granting us that much independence, does not prevail with her to give Canada and other colonies a little more rope. The cat might give the mouse a little more play, and yet make sure of its victim.—***Ed. P., L., and A.***

the joists and at the same distance, by extending poles across the house between the logs of the pen. The house is covered tightly with pine boards; and if it is intended to cure by fire, the openings between the logs should be closed to prevent the escape of heat. Such a sized house will cure from two to three thousand weight, according to the quality of the tobacco. If it be decided to cure by fire, the tobacco is carried immediately from the field to the house, hung on sticks as before described, and these sticks crowded as close together on the tiers as they can possibly be, so as to exclude all air from the tobacco. It remains in this situation until the leaves of the plants become yellow, or of the color of hickory leaves just before they fall. This will generally happen in four or five days, when the sticks must be spread and placed at their proper distances apart in the house. About six or seven inches is the proper distance, or any other that will prevent the plants on different sticks touching each other. A moderate heat, which is gradually increased to a very strong one, is then applied, by making different ranges of fires throughout the house, and that wood is preferred and sought for, which will make the greatest heat with the least blaze and smoke. The fires must be continually kept up until the curing is effected, (say from four to six days,) when not only the leaves, but the whole stalk becomes dry, and changes from a green or yellow to a light brown color.

If it is not to be cured by fire, the tobacco is brought to the scaffold and hung, and the sticks are crowded in the same way on the scaffold, until the same yellow color is imparted to the leaves; and some planters are so particular as to cover their scaffolds with green bushes during this crowded state, to prevent sun-burning. When the proper time arrives, which is indicated by the yellow color of the leaves, the sticks are thinned and placed at such a distance as to admit the influence of the sun and air; and if the weather is warm and fair, in five or six days the curing will be so far effected as to justify the removal of the tobacco into the house, when it must be properly and finally arranged, and the cure will be gradually accomplished by time and season. But if damp, hot weather supervenes, it will be necessary, both in this and in the case of tobacco already cured by fire, to make moderate fires under each whenever it comes in very high order. In such weather and in such order, tobacco is liable to contract a mould about the stems, which can only be prevented by keeping it dry by fires. This mould injures both the quality and appearance greatly, and cannot be easily rubbed off. Great attention is therefore necessary to prevent it by these occasional firings, until regular cool weather sets in, after which there is no danger. From the vicissitudes of our climate for some years past, and other causes, it happens commonly that some portion of our tobacco is not mature, and is left until we are compelled to cut it by the approach of frost. Such plants, even if fully ripe, seldom cure of a good color or quality, for want of proper seasons. And here we may venture a general remark, which is, that tobacco cut early and fully ripe, will cure well and be of good quality under the most unfavorable circumstances, while that which comes late into the house is difficult to cure and of inferior grade. After the housing of tobacco is all accomplished, and cool weather begins, the house should be closed with green bushes, or fence rails set up on end close around on the outside of the house, to exclude damp air and beating rains, which generate mould, &c.

CONSISTENCY.

The poorest policy of a State is to plant her supremacy on the production of a particular staple or monopoly; for not only is any such attempt constantly liable to physical changes, but it also provokes opposition, and an energetic effort on the part of all other States to evade or crush the monopoly. That State will always be the richest, most powerful, and most civilized, whose people can boast of the greatest variety of natural products, and the greatest number and variety of industrial pursuits.

Our readers will scarcely credit us when we tell them that the above is from an ultra free-trade paper, one of the most determined supporters of the tariff of 1846, the passage of which was urged upon the ground that it was to the interest of the nation to continue as much as possible purely agricultural. The consistency of our free-trade friends is most remarkable.

IRRIGATION.

Translated principally from the "Journal d'Agriculture pratique."

BY F. G. SKINNER.

[*Continued.*]

Rain-water.—Of the rain-water that falls, the earth can absorb but a small portion. The remainder flows upon the surface to the brook or river towards which the slope of the land inclines. Rain-water, at the moment of its fall, is the purest of all others, but in flowing over the surface, it carries off great quantities of fertilizing substances. By conducting these waters (after they have washed a certain space) over the surface of grass lands, they are to a certain extent filtered, and the greater part of the fertilizing matter they contain is deposited upon the sod. The fertilizing qualities of rain-water vary with the soils over which they pass. Thus water flowing over a calcareous soil is considered much better than that derived from a clay soil, because in the latter case a tenacious mud is sometimes deposited, which injures the grass if the irrigation is immediately followed by a drouth. Water flowing over a sandy soil also produces good effects, provided the sand is mixed with clay. But it often happens that such water carries along with it quantities of sand, which can be of benefit only to marshy land. To the use of rain-water for the purposes of irrigation there are two serious objections: first, the irregularity of supply, and then the great quantiy of foreign matter usually carried along by it during heavy rains. In some cases these objections may be obviated without much expense; for instance, in favorable situations dams may be constructed and the water retained until the foreign matter is deposited and until the proper moment for application.

Now and then the accumulated mud may be taken from these reservoirs, and it will, after exposure for a time to atmospheric influences, make excellent manure. Water derived from melting snow is also to be considered as rain-water, but, on account of its low temperature, it has no effect upon vegetation. It can only become useful when, after a detention in the reservoir, it becomes warmer, or when it happens to be charged with slime which is deposited upon the meadow.

Spring waters have various properties, which are particularly manifested by their action upon vegetation. These properties are derived from the soil in which the water is amassed, or through which it flows before appearing at the surface. Water flowing through chalk or calcareous strata acts powerfully upon the growth of grass; issuing from a sandy soil or sandstone, its effects are similar, but not so marked. The tannin and other vegetable matters and acids, frequently contained in the waters issuing from forests, injure them for irrigation, and the same remark may be applied to water running from marshes. The temperature of spring water is various; in some cases, it is so low that the water will readily freeze, in others so high as to thaw ice and snow. For irrigation, water of a high temperature is always to be preferred, and very cold water should be detained in reservoirs until the temperature rises, before it is used.

The sweet grasses flourishing around a spring are indicative of the good quality of the water; the sour grasses, on the contrary, indicate the re-

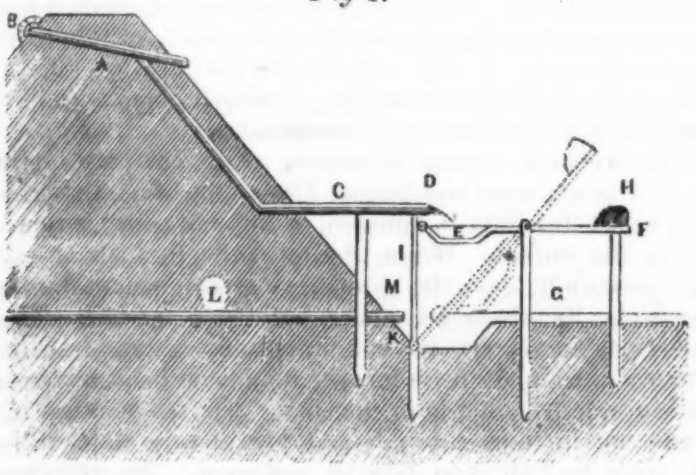
verse. Water-cresses and long green filaments are good signs; but if, instead of these, the bottom of the stream be covered with a brown flocculent substance, and the surface exhibit an oily appearance, its water is to be absolutely rejected.

The beneficial effects of water are greatly augmented by gathering it in a reservoir into which the wash from the house and stables is turned. Meadows in the immediate vicinity of and below the farm-yard thus acquire extraordinary fertility. To distant fields the urine may be conveyed in hogsheads, and mixed with the water in the reservoir; the water may also be enriched by throwing manure into it, but this would be bad economy unless there be a certainty that the whole of the water will be turned to account.*

In the Vosges mountains, in Eastern France, where irrigation is thoroughly understood, the system of reservoirs generally prevails, and one striking advantage attending it is, that the merest threads of water can be made available. In that country the liquids and offal from the dwelling and stables are collected together with the water from the spring into a reservoir, which is opened as often as it becomes full, and the land irrigated; but as the slope of these mountain meadows is often very great, the water has not time in its rapid flow to deposit all the fertilizing matter held in solution; hence, to avoid the loss of this, and to derive the utmost benefit from the element, it is caught in furrows, after irrigating a certain space, and conducted to a second reservoir, and there detained to water slopes lower down.

Thus, as is often the case, the same water is used several times by the same farmer, and sometimes by several, before it reaches the bottom of the valley. A similar method is practised in several of the Swiss cantons. Rain and spring water is gathered in reservoirs, and as these are often distant from the house, and it cannot always be known when they are full, a self-acting contrivance is used which lets off the water when it reaches a certain height, and closes the reservoir again when empty. (See drawing, fig. 1.) A is the dam forming the reservoir. B is the highest point to which the water can rise. When the water reaches the point B

Fig 1.



* Guano in sacks of open texture, and placed in the irrigating canal, would probably go further in this than in any other way that could be devised.

it enters the pipe C, and at D pours into a wooden spoon E, the handle of which extends to and rests upon the point F. G is a strong post, with a slat at the top, through which the handle of the spoon passes, and in which it is fastened with an iron pin. H is a stone, to counterbalance the weight of the spoon. I is a narrow plank, movable at the hinge K. At M this plank is furnished with a leather bung, which stops the mouth of the conduit L, when the plank is kept in a perpendicular position by the pressure of the spoon E. The reservoir being full, the water passing by the pipe C falls into the spoon; this becoming heavier than the stone H, its counter-balance, falls, releases the plank I, and the water pours forth at M into the irrigating furrows. When the reservoir is empty, the spoon ascends, the plank I resumes the perpendicular, and the bung stops again the outlet at M. The dotted lines indicate the position of the spoon and the plank I, when the reservoir is full, and the water pouring out at M.

The progress lately made by the natural sciences now furnishes the means of creating artificial springs, supplying abundance of water to places hitherto deprived of it. These artificial springs, called *Artesian wells*, are made by boring to a greater or less depth. To obtain water by this process, there must exist beneath the surface a reservoir lacking a natural outlet; or there must be an underground stream with its source higher than the point at which the boring is effected; and, moreover, the pressure of the water must be such as to force it to the surface. These conditions are usually found united upon extensive plains, without springs at their surface, but which contain subterranean waters, descending from the surrounding mountains. Generally in this case the water is found between two impervious strata, and it gushes out at the surface when the upper stratum is perforated. It often occurs that these reservoirs are at a great depth, in which case boring becomes very expensive. A knowledge of geology and of the formation of the surrounding hills and mountains is an indispensable requisite to the acquirement of the art of boring for water, and it is therefore not advisable that the farmer should attempt it unless with the certainty of attaining his object at no very great depth, and at small cost.*

Besides a knowledge of geology, which may point out with some degree of certainty the existence of subterranean waters, there are other signs by which their presence may be detected; these are, plants flourishing only in moist places, and lastly, the emanations of vapor hanging over such spots. But generally springs discovered by these means are too feeble to be of much importance to irrigation.

Brook and River Water.—The composition of these waters is infinitely various; they lose by atmospheric influences the pernicious qualities sometimes possessed by spring water, and at certain seasons they carry with them an unctuous mud which renders them particularly valuable. There are streams, however, to which the same remarks made upon springs will apply. They are such as run through forests and marshes, and thus become charged with acid and astringent principles, unfavorable to the growth of grass. Still worse are the waters running from mines, forges, and tanneries. Streams which flow over calcareous soils, and which are charged with calcareous sediment, are of excellent application in winter

* In portions of the State of Alabama these wells abound, and the expense of boring is not great.

and autumn; but their use must cease from the moment the grass begins to shoot in the spring, especially in time of drought, for the sediment they then deposit is injurious. When trout, pickerel, or crayfish thrive in a stream, the inference is, its waters are well adapted to irrigation, no matter what appearances may be in other respects.

In relation to this subject, Professor Johnston writes thus, describing some water sent him for analysis:—

"The water rises from several natural springs, which, after being united into one body, are directed into the artificial channels provided for the irrigation. It is perfectly transparent, colorless, and tasteless. It is very soft, scarcely giving any curd with soap; and the application of chemical tests shows it to contain a very minute proportion of gypsum and common salt.

"When evaporated to dryness, it leaves a very small residue of solid matter. An imperial gallon leaves only 5.2 grains. It is therefore an exceedingly pure water. I have never, indeed, met with a natural spring water in which the proportion of solid matter was so very small.

"When the proportion of solid matter is so minute as this, it is difficult to obtain a sufficient quantity for a quantitive analysis. Our supply of the water amounted only to about a gallon, so that the results of the subsequent analysis of the 5.2 grains, made by my first assistant, Dr. Vœlcker, are of course open to correction. This analysis gave for the composition of the solid matter in an imperial gallon:

"Alkaline salts, (chiefly common salt,)	1.14 grains.
Sulphate of lime,	1.66
Carbonate of lime,	0.26
Carbonate of magnesia,	0.46
Organic matter,	0.76
Silica,	0.92
	5.20 grains.

"The result of this analysis is very interesting. It shows that what we are in the habit of considering the purest natural spring waters, containing the smallest proportions of mineral water, may be used with advantage for the purposes of irrigation. It is true that, thougth the proportion of mineral matter is small, it is all of a useful kind, such as is fitted to supply the necessary wants of the growing herbage. The silica, the gypsum, the lime, the magnesia, and the alkaline salts, are all the food of plants, and are required in the growth of grasses. The absence of iron in any appreciable quantity is probably a favorable circumstance, and allows the other ingredients of the water to produce their full effect upon the vegetation. That these ingredients do really favor vegetable growth is shown by the *numerous water-cresses* which grow naturally in the water. So far as my experience goes, indeed, I should say, that any water in which water-cresses spring up may be safely employed for irrigation.

"The result is also encouraging. So long as it was believed that waters which descended from limestone districts, or which from other sources are impregnated with much mineral matter, would alone prove useful to the irrigator, doubt and hesitation could not fail to exist in the mind of the practical man as to the pecuniary advantage he might derive from any outlay upon irrigation. There is scarcely a stream among our hills

and mountains in which the advantages of a skilful irrigation may not be confidently anticipated. Another point I may advert to as suggesting itself in connection with the composition of this water. If the benefit obtained from its use be so great as to increase the value of the grass nearly ten times, though the supplies of solid food it contains are so very small, how much greater should be the effect of those far more rich liquids that flow from our farm-yards, or which after showers of rain exude from our dung-heaps and escape into the nearest brook? Even enlightened farmers, who are aware of the value of the more concentrated liquids of their cattle-yards and stables, are yet skeptical as to the worth of such as, by their color, betray no marks of richness. The water of Glenythan is far less rich than any of these, and yet it caused land that rented for only one dollar and twenty cents an acre to yield *four tons of hay per acre.*"

[TO BE CONTINUED.]

THE MUTUAL DEPENDENCE OF NATIONS.

For half a century, the press of England has harped upon the beauties of the mutual dependence of nations. To the planters it has said, "Send us all your cotton; put up no machinery for yourselves; you shall have cheap cloth, and we will take all your cotton." All at once, however, it is discovered that flax is likely to take the place of cotton, and at once the tune is changed, and the mutual independence of nations is found to be even more worthy of admiration than the mutual dependence before so warmly commended. In illustration of this, we place before our readers the following extract from a recent speech of Sir James Graham, one of the most distinguished members of the British Free Trade Cabinet:—

> This question of the price of cotton did, he thought, open up some hope for the landed interest. And from whence did it come?
>
> —— "Via prima salutis
> Quod minimè reris, Graiâ pandetur ab urbe."

(Cheers.) As he had said, from whence they could least expect it—from Rochdale. (Hear, hear.) From the house of Bright, Brothers. (Loud cheers.) It had been discovered through their means that, by an invention in science, flax stalk might be used to great advantage, and in diminution of the cost, in mixture with cotton-wool, sheep's-wool, and even, as he had been informed, with silk-wool. (Cheers.) The loss of the potato crop was, doubtless, a severe infliction, but he could consider no dispensation of Providence more remarkable than that it should have become the means, by the aid of science and skill, of overcoming the difficulty consequent upon the diminution of the supply, and the increase in price, of the raw material of our principal manufacture. *By this discovery we should be in a great degree made independent of the foreign supply of the great staple of our manufacture;* and if the cultivation of flax met with due encouragement, they would hear but little more, he was confident, of the distresses of the weavers of Carlisle.

The perfection of a system of trade would seem, in the eyes of Sir James, to be that of having us dependent on England for supplies of cloth and iron, and England independent of us for supplies of cotton. She would thus be enabled, even more than at present, to fix the price of all she buys and all she sells, the great object to be accomplished in compelling all the world to make their exchanges in her market.

From the Journal of the Roy. Ag. Soc. of England.

EXPERIMENTS WITH GUANO AND OTHER MANURES.

No. I.

BY E. S. BEARME.

REPORT of an Experiment to test the comparative efficiency of five different kinds of Artificial Manure in improving Pond Mud, the experiment being made on an acre of inferior pasture land in Stover Park, in the years 1847, 1848, and 1849.

The land on which the experiment was conducted is of uniform quality, the soil being a light, sandy loam, a few inches in depth, incumbent on a stratum of white clay.

The land underwent thorough draining in 1844, prior to which it would not produce a rent of more than 5*s.* an acre.

No manures were applied to the land in 1848 or 1849.

The object sought to be attained by extending the experiment over a period of three years was to test the *durability* of the different manures.

No.	Manures applied in 1847.	Weight of hay cut in 1847.	Weight of hay cut in 1848	Weight of hay cut in 1849.	Weight cut per acre in 1847.	Weight cut per acre in 1848	Weight cut per acre in 1849.	Cost of the Manures.		
		lbs.	lbs.	lbs.	Seams of 3 cwt.	Seams of 3 cwt.	Seams of 3 cwt.	£.	s.	d.
1	Six cubic yards of mud mix'd with six cwt. of salt	312	327	613	4⅖	4¼	9	0	14	0
2	Six cubic yards of mud mixed with 1½ hogshead of lime	353	337	538	5¼	5	8	0	13	6
3	Six cubic yards of mud mixed with three bushels of bone-dust	511	419	670	7⅖	6¼	10	0	14	3
4	Three cubic yards of mud mixed with three cubic yards of tan-yard refuse	524	354	558	7¼	5¼	8⅖	0	14	0
5	Six cubic yards of mud mixed with 90 lbs of Peruvian guano	930	550	725	13¼	8	10¾	0	14	0

N. B.—The after-grass in 1847 was stocked with sheep, but in 1848 it was left unconsumed.

No. 2.

REPORT of an Experiment made with the under-mentioned Manures on an acre of pasture land in Stover Park, in the year 1849.

The manures, when mixed with a small quantity of fine earth, were applied broadcast on March 29th, and during the rainy weather which prevailed at the time.

The land is of a fair average quality, and was formerly used as tillage land, but has been in pasture for many years.

The crops were mown on 22d June, and the herbage produced by the different manures was of a superior quality.

No.	Manures applied.	Quantity of Manures applied.	Quantity applied per acre.	Weight of hay cut.	Weight cut per acre.	Cost of the Manures.			Cost of the Manures per acre.		
		cwt.	cwt.	lbs.	Seams of 3 cwt.	£.	s.	d.	£.	s.	d.
1	None	....	....	401	4¼	....			....		
2	Superphosphate of lime	2¼	9	616	7⅖	0	18	0	3	12	0
3	Nitrate of soda	1	4	706	8⅖	0	18	0	3	12	0
4	Peruvian guano	1⅗	6	1210	14⅜	0	18	0	3	12	0

ON THE PROPER QUANTITY OF SEED FOR WHEAT.

BY R. BIRCH WOLFE.

In 1848 I communicated the result of an experiment made by me on thin and thick sowing of wheat, which was published last year in the Journal of the Royal Agricultural Society; and from the statements I then made, it appeared that 7 pecks of seed, drilled at 7 inches apart, gave a produce of nearly a quarter of an acre more than 6 pecks drilled at 9 inches, the cultivation and land being equal.

As it was impossible to arrive at any satisfactory conclusion from a single experiment, I made a further trial last year, and, having now accurately ascertained the results, I give them, that if thought of any use they may appear in a future number of the Society's Journal. The land marked out for the experiment consisted of 3 acres lying together in a field of 16 acres, and divided into 4 plots of 3 roods each; the cultivation was exactly alike in each case, and the soil heavy clay in good heart; the seed Spalding wheat. I may add that the whole of my land is formed into *flat* stetches 7 feet 2 inches wide, which are exactly covered by the drill, harrows, and rollers, all made with double shafts, and the horses walk between the stetches.

EXPERIMENT.

Width of Drills in inches.	Seed at rate per Acre.	Produce in Sheaves.	Produce in Grain from the 3 Roods.	Produce at rate per Acre.	lbs. Weight per Bushel.
			Qrs. R. P.	Qrs. R. P.	
9	5 pecks.	689	4 0 0	5 2 2	62½
6½	7 do.	665	4 0 0	5 2 2	62½
8	6 do.	681	4 0 3	5 3 2	63
Dibbled and dropped by hand at 8 inches.	6 do.	692	4 1 0	5 4 0	61½

It will be seen by the above statement that the produce from each parcel of land was very nearly the same—that which was dibbled failed most in plant, but tillered well, and yielded rather more than the rest, but in proportion as the plant was thin, so was the grain coarse and light.

From the frequent observations that I have made, and judging from both the above experiments, I have come to the conclusion that, taking the average of seasons and all other circumstances into account, there is great risk of loss in drilling wheat in such land as mine, at a distance of more than 8 inches, and with less seed than 6 pecks per acre. In heavy land, of average quality, well drained, and in good heart as mine is, the above quantity of seed (6 pecks) and intervals (8 inches) will, I think, be found the safest and most productive; at the same time it is very probable that less seed and greater intervals might answer as well or better in lighter land of superior quality, supposing the system of cultivation to be carried out upon the most approved principles.

I have this year acted upon the conclusion I have come to, and drilled all my wheat (about 80 acres) with 6 pecks of seed, and at 8 inches apart, and up to this time I am perfectly satisfied with the promise.—*Jour. of Roy. Ag. Soc. of England.*

We have been requested to insert the following paragraph:—"An important improvement in machinery for agricultural purposes has just been effected by the eminent engineering firm of Clayton, Shuttleworth, & Co., of the Stamp End Works, Lincoln. The improvement consists in combining in one implement facilities for threshing, shaking, and blowing, and in substituting, in lieu of the revolving cloth heretofore used to collect the wheat and pulse from under the straw-shaker, &c., a trough, having a vibratory motion, and which performs its office admirably. By this machine the wheat is delivered at one aperture, the long straw at another, and the chaff, short straw, and pulse at another. This important improvement, which is registered, is said to have the effect of saving the labor of four men—a circumstance, in these hard times, of no small moment to the farmer, who is compelled to resort to every expedient to render his occupation remunerative."

For the Plough, the Loom, and the Anvil.

SHADE THE GREATEST FERTILIZER.

WINCHESTER, February.

DEAR SIR:—The experience of the civilized world has clearly demonstrated the fact, that with manure only the soil under cultivation cannot be made to preserve its natural fertility. Liebig says, *Agricultural Chemistry*, page 51: "The first colonists of Virginia found a country the soil of which was similar to that above mentioned; harvests of wheat and tobacco were obtained for a century from one and the same field, without the aid of manure; but now whole districts are converted into unfruitful pasture-land, which, without manure, produces neither wheat nor tobacco. From every acre of this land there were removed in the space of one hundred years 12,000 lbs. of alkalis, in leaves, grain, and straw. It became unfruitful, therefore, because it was deprived of every particle of alkali, which had been reduced to a soluble state, and because that which was rendered soluble again in the space of one year was not sufficient to satisfy the demands of the plants. Almost all the cultivated land in Europe is in this condition."

And you well know, Sir, that this statement of the impoverished condition of the soil in this country is not solely applicable to Virginia; that all the cultivated lands are regularly progressing to the same result in every State in this Union;—not so obviously in the Northern as in the Southern States, only because the cheap and efficient labor always at the command of the Southern farmer enables him to crop his land more frequently and more extensively. It appears to me that the cause of this may be satisfactorily explained by consulting the experience of the individual farmer. He has been taught from time immemorial to the present day, that manure is indispensable to the preservation of the fertility of his land; or, in the words of a late writer, (Anderson's *Economy of Manures*,) "I beg it to be understood as my decided opinion that farm-yard manure must always be the farmer's main-stay." In obedience to this precept, he sets himself to work with energy and industry to collect and apply manure, and finds it utterly impossible to manure one tenth of his cultivated land. The result is inevitable; nine tenths being exhausted by the crop, and only one tenth improved by the manure, must terminate in its exhaustion. Or, what more strikingly illustrates this, if he cultivate a field of one hundred acres in corn every year, and only succeed in manuring ten acres, this field, in the course of forty or fifty years, will exhibit an appearance precisely similar to the exhausted lands in many districts of the Southern States. But every practical farmer knows, or ought to know, for the facts are constantly before his observation, that land can be made exceedingly fertile without manure. He must have noticed that if any portion of the soil have been covered, either accidentally or designedly, for some time, by water, stone, plank, logs, chips, brush, rails, corn-stalks, straw, buildings of every description without cellars, hay or straw ricks, leaves or clover, and in fact that under any and every substance which has covered its surface closely, it invariably becomes exceedingly fertile, and that the degree of this fertility is totally independent of the quality of the covering substance. Before we examine into the nature of this fertility, it will be necessary first to consider what manure is. Liebig says, page 56: "With us thick books

are written, but no experiments instituted. The quantity of manure consumed by this and that plant is expressed in hundredth parts, and yet we know not what manure is." It is very certain, Sir, that the analysis of manure does not demonstrate that it possesses a fertilizing principle, or the peculiar combination of principles which constitute it a fertilizing substance. And yet we are gravely advised to appoint chemical inspectors of manure!! The experience of the practical farmer has taught him that neither animal nor vegetable matters are of any value as manure, unless collected in quantities and mixed in his barn-yard or stables; that it there undergoes a peculiar fermentation termed putrefaction, the product of which proves exceedingly valuable in fertilizing the soil. It is very manifest that the value of this product essentially depends upon the perfection of the putrefactive process; for the interruption of this process, from any cause whatever, never fails to lessen its value, and the prevention renders it worthless. It is uniformly most valuable when made in pits or vaults, and better in stables than in the barn-yard. No wonder the farmer, in every age, has attached so much importance to the collection and preparation of manure; for it is the only substance which he has ever known which would enable him to raise a crop of any kind in an exhausted soil, and which has proved equally efficacious upon all soils suitable for cultivation, no matter what the deficiency in its mineral constituents. Scientific men have attached much importance to the ammonia which uniformly escapes during the putrefactive fermentation, and much of the value of the manure has been attributed to it; why, I am unable to understand. For it appears to me that it would be quite as philosophical to attribute the flavor of Madeira wine to the carbonic acid gas which escapes during the vinous fermentation, as to imagine the value of manure to depend upon the escape of ammonia which characterizes the putrefactive process. If ammonia be so powerful a fertilizer that the minute quantity of it which the chemists have been able to detect in the atmosphere when fixed by the action of gypsum exerts so wonderful an influence upon the growth of clover, why is it that the sulphate of ammonia does not prove a cheap and efficient substitute for barn-yard manure? The well-known fertility of some forest lands when first subjected to cultivation has been ascribed to the decomposition of vegetable matters. "Some virgin soils, such as those of America, contain vegetable matter in large proportion; and as these have been found eminently adapted to the cultivation of most plants, the organic matter contained in them has naturally been recognized as the cause of their fertility. To this matter the term vegetable mould or humus has been applied; indeed, this peculiar substance appears to play such an important part in the phenomena of vegetation that vegetable physiologists have been induced to ascribe the fertility of every soil to its presence. It is believed by many to be the principal nutriment of plants, and is supposed to be extracted by them from the soil in which they grow. It is itself the product of the decay of vegetable matter, and must therefore contain many of the constituents which are found in plants during life." (See Liebig, p. 11.) The erroneous definition of such an important principle as this must have led to serious errors in practical agriculture. The decay of no vegetable substance upon the surface of the earth ever forms manure. Von Thaer remarks, (*Principles of Agriculture*, p. 202:) "In the open air, and without the intervention of moisture or of any additional heat, the process of fermentation and putrefaction is not perceptible; a species of decomposition does however take place

which is similar to slow combustion. This decomposition produces a very different matter to that which is the result of putrefaction, and one which is smaller in quantity, because the greater part of the carbon combines with oxygen and evaporates under the form of carbonic acid." We do not find any appreciable deposit in those hollows in which the leaves have been accumulating and decomposing for centuries, which certainly would not be the case if they had been converted into manure. That the trees require a great deal of nutriment is manifest, for, if a few be left in a cultivated field, they exhaust the soil for some distance around them; and that they consume the same food as cultivated plants is proved by the fact that they can be made to thrive in an exhausted soil with manure, and with manure only. Whence, then, do the trees derive so much manure as not only to render their growth luxuriant but to leave the soil fertile beneath them? I answer, from the shade, and shade only. The mould or rich earth termed humus, which is found in the forests under the leaves or loose stone, is the residue of the putrefaction of the earth itself, caused by shade, and may be found in all locations favorable to the generation of the putrefactive process. Liebig says, page 44, "The subterranean vaults in the old castles near the Rhine, the 'Bergstrass,' and Wetherau, are constructed of sandstone, granite, or basalt, and present appearances similar to the limestone caverns. The roofs of the vaults or cellars are covered externally to the thickness of several feet with vegetable mould, which has been formed by the decay of plants." Could vegetation have ever existed in such a location as this? I am told that it is found in quantities in the Mammoth Cave, Ky., and may be found also in vaults and caves, and under old buildings of every kind. In fact, under any and every substance which shades the surface of the earth densely, it may be found in quantities dependent solely upon the density and duration of the shade. The poorest soil, no matter what the deficiency in its mineral constituents, will be changed in color, consistence, and fertilizing qualities, when closely covered. The natural or innate fertility is possessed by all earth, from whatever depth it may be obtained; but this substance, humus, is found only where the earth has been favorably located for putrefaction. It is certainly manure, for it feeds all plants in every variety of soil. The practical importance of a knowledge of this is manifest, for the farmer will no longer attempt to preserve the natural fertility of his land by manure, which no energy or industry has ever yet enabled him to accomplish. He will keep no stock with a view to convert his vegetable matter into manure; for, by spreading the raw material upon his land, he can cover a much greater extent of surface, as well as impart a more permanent fertility to the soil. He will value his clover for its shade only, for he will find that a luxuriant growth of clover untouched for one year will impart a more permanent fertility than the best manure. We know that this effect is not the result of any peculiar quality in the clover crop, for the pea-vine in the South, and a bitter weed, the white lupine, in Italy, produce the same degree of fertility. Von Thaer says, page 229: "We bestow a most active and abundant vegetable amendment on a soil when we sow it with plants adapted to its nature, which will flourish and attain the highest state of development; and then, when they have begun to flower, either bury them by the action of the plough, or have them eaten off the ground, or trodden in by cattle. This practice is of great antiquity; it was held in high estimation by the Romans, and exists at the present day in Italy. There it is that the amelioration produced by a

crop which has been buried while green is the very best that can be bestowed on a soil, and is capable of bestowing on it the utmost degree of fertility of which it is susceptible; indeed, they even prefer it when there is a sufficiency of animal manure." I quote this paragraph to show that the fertility imparted to the earth by the growth of vegetable matters has long been known and appreciated by practical farmers. It is true that their value has hitherto been attributed to their decomposition when ploughed under, but this opinion is certainly erroneous. Vegetable substances, unless tainted with putrefaction, saturated with water, or mixed with lime or ashes, I confidently assert, never form manure when ploughed under, the apparent fertility being attributable solely to the previous shade, for reasons which I shall now assign.

1st. The residue of no other decomposition, to which vegetable substances are subject, than the putrefactive, ever proves to be manure.

2d. Vegetable matters ploughed under are deprived of a contact of air, which is known to be indispensable to the generation of the putrefactive process.

3d. It is well known that vegetable substances impart much fertility to the surface of the soil previous to their decomposition. This fertility is neither increased by ploughing them under, nor diminished by their previous removal.

4th. Other substances, such as plank or stone, which are not decomposed, impart an equal fertility. A very respectable farmer, near Winchester, found it necessary to rebuild his mill. The roof being sound, he had it removed and placed on a knoll in the adjoining field, intending to use it for sheds. Circumstances prevented this until the fall after, (about 15 months,) when he seeded the field in wheat. He was astonished to find that the land which had been covered by the roof produced much better wheat than other portions of the field which had been well manured. Another farmer, in preparing his field for a crop four years ago, picked up the loose stone and placed them in large piles in the field. Last year he cultivated the field in corn, having previously removed the stone. He says that he made three times as much corn from those spots which had been covered by the stone piles as from any other portion of the field.

How can these facts be satisfactorily explained?

Yours, respectfully, ROBT. BALDWIN.

MIXING PEAT CHARCOAL WITH STORED POTATOES.—A subscriber writes: "From the properties of the peat charcoal it occurs to me, that it might act as a preventive to decay if it was mixed with potatoes when pitted for the winter. Will you have the kindness to give your opinion, and suggest the mode of doing it and the quantity necessary to be used?" From the well-known antiseptic properties of charcoal, more particularly peat charcoal, the suggestion (which is not new) of mixing the latter with stored potatoes, to prevent or arrest disease or decay, is feasible. The mode of doing so is to scatter the peat charcoal amongst the potatoes as they are being stored or pitted. You may use any quantity, the more the better, particularly if the potatoes be damp or wet at the time.—*Farmer's Gazette.*

REAPING MACHINES.—The *Prairie Farmer* says that the immense amount of machinery introduced into the harvest-field at the West, will entirely obviate all inconvenience from any apprehended scarcity of help; and that probably not less than 3,500 new reaping machines will be put in use in the North-west the present season—equal to the labor of 17,500 men.—*American Cultivator.*

THE following, which we take from the *Rochester Democrat*, is recommended to the particular attention of our readers:—

IS CONSISTENCY A JEWEL?

The *New-York Dry Goods Reporter* commends this question to the Free-Trade League for its immediate discussion. It is moved to propound the question by the application to Congress for aid to the Collins' line of steamers, on which the *Reporter* discourses in this wise:—

"Mr. Collins is the chief prop of the Free-Trade League in this city, and is utterly opposed to the principle of protection to American skill and industry.

"He esteems it unjust and unwise to protect American iron, American coal, or American manufactures by any amount of duty whatever. In this day of relaxation from the experience and legislation of former years—this day of universal brotherhood—it is ungenerous to protect American at the expense of British interests! England can supply us with cloths, with muslins, with cotton prints, with books, with hats and boots—in short, with every thing we require, cheaper than we can manufacture them for ourselves; and it is a fraud upon the consumer (no matter if he is unable to earn enough to buy a decent coat)—it is a fraud upon humanity to levy duties upon these indispensable articles. The Americans are an agricultural people—essentially so, if we may believe the English—and it is wrong to divert them from their natural employment; it is wrong to remind them of their rivers, their lakes, their coal-beds, and their water-falls. Not only so think the English, but the whole league of free-traders who support the English theory.

"Nevertheless, and notwithstanding these arguments, Mr. Collins, when he found himself in a tight place, did not hesitate to perceive his own case was an exception to the general rule. *His free-trade friends seemed to think so too, and aided him all they could.* His line of steamers already enjoyed a monopoly, and a large annual subscription, but it wanted more aid, more money, more discrimination in its favor. *Protection* against English competition was earnestly implored by the great Protagonist of the free-traders!

"Now for our part we see no difference between protecting Mr. Collins' line and Mr. Snooks' factory. Indeed, the latter employs more laborers, expends more money, and improves the condition of the farmers about it more than Mr. Collins' steamers possibly can, the expenditures for which are partially and necessarily made in a foreign port.

"If it is right and just to protect Mr. Collins' private interests, because their success flatters our national pride, we do not see why we should stop short with his particular case. We do not see why we cannot consistently feel a pride in manufacturing the finest woollens and cottons in the world, and in entirely surpassing the English fabrics in cheapness and excellence.

"We cannot perceive why the piston should have such decided protection from the government, and the loom and the anvil have none."

There is a certain Mr. Brown, a member of the British Parliament, and the author of a free-trade letter to Secretary Meredith a little more than a year ago, who could doubtless make the distinction intelligible to the *Reporter*, which exists between protection to the piston when it is employed in driving a steamship, and protection to the same piston when it is driving a steam mill. Protection in the first case is in accordance with what Mr. Brown and his school consider well-settled principles of economy; protection in the last case is, in their mature judgment, "an exploded fallacy." Mr. Brown signified as much to Mr. Secretary Meredith, who, but for the information, might have thought, as the *Reporter* does, that the system which admits the one might, without stretching, admit the other also. Mr. Brown and his school—the calico school of economists—have always advocated protection for the machinery of transportation, ships and the like, and *no* protection for ploughs, and looms, and anvils, the machinery which produces. To fetch and carry, according to their notions, is the great business to which mankind should be encouraged to devote their energies. But the idea of encouraging them to *create* values, instead of toting about those already created, is obsolete.

This Mr. Brown, we understand, is largely interested—to the tune of hundreds of thousands of dollars—in the Collins line. It is just possible that this circumstance may explain how it comes that Mr. Brown exhorts Congress not to listen to Mr. Meredith's recommendation, to speed the pistons in the mills, by securing the domestic market for their products, at the expense of English producers, and yet is anxious that it should speed the pistons in the steamships at the expense of the American treasury.

CHECK TO THE PURELY AGRICULTURAL INTERESTS.

WHENEVER it is proposed to sacrifice the agricultural interest by destroying the existing market on the land for the products of the land, the English and American free-traders assure the farmers and planters that it is all for their own good, and that it is far better to depend upon a distant market than a near one. They are then assured that the commercial and agricultural interests are the best of friends, and that the triumph of one is necessarily the triumph of the other. Occasionally, however, the truth comes out; and we now furnish a specimen of the real thoughts of an English free-trader, by which it will be seen that, in the existing commercial policy, "the purely agricultural interests have received a check" from which they are little likely to recover, and that the balance of power and influence is hereafter to be in the hands of *the middlemen*, who produce nothing, and grow rich by standing between the producer and the consumer:—

Of the States destined to stretch along the Pacific, the development and destiny will be, like those of the Atlantic board, commercial. They will cover the Pacific with their fleets long before their ploughs reach the foot of the Rocky Mountains. *They will be a race of traders, not of delvers;* slavery they will none of. Such labor as is required is the labor that freemen can and will accomplish for themselves, and in which they will not permit the slave to participate; *and thus the purely agricultural and anti-productive interests have received a check*, and the limit which restores the balance of power and influence may already be discerned. The new census throws a startling light upon some of these facts.—*London Examiner.*

The complimentary manner in which the planters and farmers of this country are noticed can scarcely fail to strike them agreeably. How long will they be content to continue a policy which tends daily to take the control of affairs from their own hands, and place it in those of "the race of traders," of all races the most purely selfish?

WHO IS IT THAT DESIRES CHEAP FOOD?

OUR corn market is very dull, being overwhelmed by the enormous receipts of flour from France; the receipts into this port alone from that country during the past week being equal to about 40,000 bbls. of 196 lbs.; and the quantity forced on the market so far exceeds the demand, that prices are quite nominal.—*London Circular, April* 19, 1851.

Some time since, the *Union* undertook to persuade its readers that the object of the system which looked to making a market on the land for its products was that of enabling the manufacturers to obtain food at low prices, and to have labor cheap. "The manufacturers want cheap food," said its editor; and to prevent them from having cheap food, the proper course is to close all the furnaces and mills, and become as much as possible dependent upon the "great grain market of the world." Their object has been accomplished, and our farmers have now to fight with all Europe for the little hold they yet have upon it; and what prospect they have of retaining any portion, may be judged from the fact that France alone, as is shown in the above extract, is supplying England with flour, low as is the price, at the rate of two millions of barrels a year.

It is clear that the market of England is not to be relied upon, and

that the farmers are to have nothing in exchange for the great and rapidly growing home market they were persuaded to sacrifice. The "race of traders" is not, however, yet satisfied. It is now required that the farmers shall relinquish their protection, and the workmen of the North and East are appealed to by the free-traders to unite with them in the effort to rid themselves of the "undue protection" afforded to the great grain-growing States. We beg our readers to read the following passage from a letter of one of these free-traders, and then determine for themselves who it is that wants cheap food:—

CANADIAN RECIPROCITY.—There is more involved in this question of reciprocity with Canada, with reference to the American people, than they seem to be aware of; and it is on their account chiefly, as a resident of New-York, that I have been an advocate of the measure. It is one of cheap bread to the inhabitants of the manufacturing districts and on the seaboard of the United States, where the necessaries of life are dearer than they are even in England—the duty of twenty per cent. on agricultural produce raising the price to the consumer proportionably, while it can be exported to England duty free; the only effect of which is to impoverish the working classes elsewhere, *that an undue protection may be afforded to the agricultural interest in the great grain-producing States of Wisconsin, Ohio Michigan and Illinois;* the operation of the laws at present in force in the United States being to enable them to ship flour and wheat at an American port on the upper lakes, and to carry it to Oswego or Ogdensburg free of duty; when, if it is sold and landed in Canada, or if these articles are the produce of the Province, they are subject to an enormous duty, which, as I before stated, raises the price to the consumer, and is severely felt by the bulk of the community, particularly in New-York.

GOOD NEWS FOR HORSES.

T. M. COLEMAN has filed a caveat for an improvement in India rubber horse-collars and saddles, which are inflated with air, instead of being stuffed, as is now the case. If the air can be retained at the very point of pressure, this will prevent chafing, and be a great relief to the noblest of domestic animals—the horse. We shall then expect to see this invention in general use, as humanity demands that even to the creature "the back should be suited to the burden."—*Harrisburg (Pa.) Journal.*

The above can scarcely fail to be interesting to our Southern and Western readers, who use to so great an extent the expensive horse, when the more economical Yankee uses the comparatively inexpensive ox. In laying it before them, we beg to call their attention to the fact, that almost every improvement in machinery required for the use of either farmer or planter comes from those parts of the country in which the plough, the loom, and the anvil are enabled to combine their exertions, and in which those who follow the plough, drive the shuttle, and strike the hammer are enabled to associate for their mutual improvement. Such being the case, is it necessary to seek elsewhere for reasons why the people of one part of the Union grow rich, while the other remain poor? Assuredly not! When men are enabled to combine their exertions, and thereby to make a market on the land for the products of the land, the farmer is enabled to use improved machinery of production and of transportation, whereby he produces more and sends it to market at less cost of freight; and, above all, he is enabled to return to the land the refuse of its products, the manure, and he and his land grow rich together. When, on the contrary, they cannot combine their exertions, and are therefore compelled to make their exchanges in distant markets, the machinery of

production is always bad, and transportation is costly; the amount produced is small, and much of it is spent on the road to market; and the manure is wasted on the road or in the distant market, and the farmer and his land grow poor together.

A NEW JOURNAL.

"THE SOIL OF THE SOUTH," is the title of a new and very promising Monthly Agricultural periodical, published at Columbus, Georgia, under the auspices of the "*Muscogee and Russell Agricultural Society.*" If success depends on the talents and fine spirit of the editor, the best may be predicted. Who the editor may be does not appear, and therefore we may say with the less hesitation, that he seems to have a clear head and a good heart. The *junior* editor very naturally says, "*Our* hope is *in woman.*" Of course he does not believe (who does?) that "*Frailty, thy name* is woman." We shall be happy to exchange, not only our journals, but all sorts of good offices with senior and junior, although they would seem to think that "nothing good can come out of Nazareth," or from north of Mason and Dixon's line. For ourselves, our birth, our associations and labors were all south of it, until *Polked* north in search of bread. Before the editors of "The Soil of the South" were born, probably, the South Carolina Agricultural Society, at the instance of no other than General THOMAS PINCKNEY, voted us a *gold medal* for our services to the Agriculture of the South. Far from being sensible of any abatement of admiration of the South, and devotion to her interests, we believe we never understood them so well, nor labored for them so efficiently as now. Reason, truth, and patriotism, however, know no geographical lines. For ourselves, we confess that we are as proud to have a Dawson from Georgia as a Grinnell from Massachusetts; a Vinton from Ohio as a Hilliard of Alabama; a Gentry from Tennessee as a Reed from Pennsylvania; a Schermerhorn from New-York as a Pearce from Maryland and a Stanley from North Carolina, all uniting, as they do, in cordially recommending the *Plough, the Loom, and the Anvil* to all who desire to see American industry fairly protected in the development of its own resources.

Our great wish is to see the labor of the country elevated and protected, and our own resources developed, as essential to the permanent prosperity of the Planter and the Farmer. We want to see permanently established a financial system, under which Planters will be seen coming together in conventions, not to devise how they shall *diminish* their crops, but how they shall increase them, to meet an ever-increasing demand at home. In this feeling, and in our efforts to carry it out, we never have, and never shall know "any South or any North, any East or any West," let our personal locality be for the time where it may. We sincerely wish success to all Agricultural Periodicals, conducted, as we are sure "The Soil of the South" will be, in a high-toned, liberal, gentleman-like spirit. Such journals have done more to diffuse both zeal and knowledge, than all the Agricultural Societies and exhibitions that have been held, or will be, from the beginning of time to the day of judgment.

WHY STEAM IS NOT LIKELY TO BE APPLIED TO THE PLOUGH.

THE following article, which appeared in a recent number of a foreign journal, is by the author of a very eloquent and learned little work, entitled the History of Agriculture.

In pronouncing the inapplicability of Steam to the operation of *Ploughing* the ground, he agrees with the views expressed in the report of 1849–'50 by the present Commissioner of Patents, whose practical skill is only to be equalled by the exquisite urbanity displayed in all of his official transactions.

Having received a copy of the pamphlet, lately published by Lord WILLOUGHBY D'ERESBY, giving plans and description of his STEAM PLOUGH, I feel the more called upon to offer a few observations on it, as I saw, when abroad lately, a long quotation of some remarks of mine* on Steam-*cultivation* appended to an engraving of Lord Willoughby's machine in the "*Illustration Universel*," (the Paris "Illustrated News,") by M. St. Germain Le-Duc.

But no two views of the subject, I fear, can be wider apart than those of his Lordship and my own. I hold it (under favor) to be an idea *fundamentally erroneous* to attempt to combine steam-machinery with the Plough. I have already given my reasons for this at some length in a little work published last year on the history of Agriculture, from which the extract in the French journal above alluded to was taken. And I hope I am not presumptuous in repeating my conviction that until the idea of the Plough, and, in a word, of all *draught*-cultivation is utterly abandoned, no effective progress will be made in the application of Steam to the tilling of the earth. I repeat what I have said before, that "ploughing" is a mere *contrivance for applying animal-power to tillage.* Get out of animal-power, and you leave "ploughing" behind *altogether.* Get into steam-power, and you have no more to do with the Plough than a horse has to do with a spade. It is *no essential whatever* of cultivation that it should be done by *the traction of the implement.* Spade-work is perpendicular; Horse-work is horizontal; Machine-work is *circular.*

Whoever would now dream of retaining the form of the hand-flail in the threshing-machine, or that of the oar in a steamship, or of putting the piston-rod to work at the lever-end of a pump-handle? Yet doubtless these bastard attempts were all made in their day, till the several inventors had come to see in turn that

> "'Tis gude to be *off with the old love*
> Before ye be on wi' the new!"

I am aware that I am repeating myself, unavoidably, in all this; but no one can imagine, without trying it, the difficulty of making the mechanical part of the question intelligible to the agriculturist, and the agricultural part to the machinist. The Steam-engine has no taste whatever for straight draught. He is a *revolutionist*, in the most exact sense of the word. He *works* by revolution; and by revolution only will he cut up the soil into a seed-bed, of the pattern required, be it coarse or fine. And *that*, it is my firm belief, he will be seen doing at a handsome average, before a very large portion of another century shall have passed over our heads. Why should it not be? Why should not a strip or lair of earth be cut up into fine soil *at one operation*, (and sown and covered in too,) as easily as a circular saw cuts a plank into saw-dust? As to employing a steam-engine to turn a drum, to wind up a rope, to drag a plough, to turn up a furrow, and all this as a mere prelude for an after-amusement to all the ancient tribe of harrows, scufflers, rollers, and clod-crushers, to do supplementally the real work of cultivation, it reminds one of "the house that Jack built." One can hardly blame the iron ribs of any respectable boiler for bursting at the first pull at a task so utterly at variance with every known law of mechanical advancement, so offensive to the economics, I had almost said the very ethics of the steam-engine.

I trust I may be forgiven for so boldly speaking; but I am sorry to think of one useful shilling being thrown away in the attempt, unprofitable even if successful, of harnessing steam with horse harness, to do horse's work in a horse's way; the im-

* See page 75, in No. 5 of the *Agricultural Gazette*, 1850.

plement itself, whose wretched work it is put to accomplish, being a tool with sentence of death written upon it, (be it ancient as it may,) for its tyranny to the subsoil, which bears the whole burthen and injury of its laborious blundering path.

I say the Plough has sentence of death written upon it, *because it is essentially imperfect.* What it does is little towards the work of cultivation; but that little is tainted by a radical imperfection—damage to the subsoil, which is bruised and hardened by the share, in an exact ratio with the weight of soil lifted, *plus* that of the force required to effect the cleavage, and the weight of the instrument itself. Were there no other reason for saying it than this, this alone would entitle the philosophic machinist to say and see that the Plough was never meant to be immortal. The mere invention of *the subsoiler* is a standing commentary on the mischief done by the Plough.

Why then should we struggle for its survival under the new dynasty of Steam? The true object is not to perpetuate, but as soon as possible to get rid of it. Why poke an instrument seven or eight inches under the clod, to tear it up in a lump by main force, for *other instruments to act upon*, toiling and sweating and treading it down again, in ponderous attempts at cultivation wholesale—when by simple *abrasion of the surface* by a revolving-toothed instrument, with a span as broad as the hay-tedding machine, or Crosskill's clod-crusher, you can perform the *complete* work of *comminution* in the most light, compendious, and perfect detail?

Imagine such an instrument (*not rolling* on the ground, but) performing *independent* revolutions *behind* its locomotive, cutting its way down by surface abrasion, into a semicircular trench about a foot and a half wide, throwing back the pulverized soil (just as it flies back from the feet of a dog scratching at a rabbit-hole); then imagine the locomotive moving forward on the hard ground with a slow and equable mechanical motion, the revolver behind, with its cutting points (case-hardened) playing upon the *edge*, or *land-side* of the trench as it advances, and capable of any adjustment to coarse or fine cutting, moving always *forward*, and leaving behind, perfectly granulated and precisely *inverted*, by its revolving action, a seed-bed seven or eight inches deep, *never to be gone over again* by any after-implement except the drill, which had much better follow at once, attached behind with a light brush-harrow to cover the seed.

It is hard, by mere language and without a diagram, to describe intelligibly to the mind's eye an instrument that has not been seen, however it may have become familiar enough to my own eye. My notion may be wrong, but I am strongly induced to feel that such an instrument alone will ever fulfil *the requisitions of the Steam-engine*, which shortens and *remodels* every labor it undertakes, and never condescends to old appliances, except where they are themselves intrinsically perfect in their mode of action.

Why did Steam reject *the Pump-handle* and *the Oar?* Because in both the leverage is obtained by loss of labor and time, occurring during the back-movement of the handle, a movement necessary to the manual, but not to the mechanical agent. For the same reason, whenever it is applied to till the earth, it will antiquate every instrument that *cultivates by traction*, because traction is not only not necessary to cultivation, but is inherently mischievous on other grounds, apart from the clumsiness, inaccuracy, and incompleteness of the work it turns out.

But THE STONES! There is much fear expressed for the teeth of the circular-cutting implement I have described, when they come in contact with stones. The objection would have been equally valid, at first sight, against the use of the Plough or the Scuffler. Let me see the instrument in use where there *are no stones*, (and there are plenty of broad acres in England of this class,) and it will not be long before it gets upon the others. If it cost five pounds an acre to clear them out, it must be done, and would in such case well pay to do it. But the truth is that the instrument itself suggests the kind of machine which, with a little adaptation, (greater power and slower motion,) might perform this preliminary service at the least expense. If land is to be like a garden in one respect, I see no good reason why it should not in all. I do not think stones will stand long in the way of Steam, or be readily preferred to bread, if, *where there happen to be none*, a steam-driven cultivator can be brought to bear, which, after the simple and beautiful example of *the mole*, shall play out the long comedy of our present field cultivation in *a single act*, present a finely-granulated seed-bed by a single process, almost at the hour required, and trammel up the "long summer fallow" into the labor of a day, with an accuracy as perfect as the turning of a lathe, and an aëration (and consequent oxygenation) of the soil as diffusive and minute as that of a scattered mole-heap, or the dust flying from a steam-saw bench.

Implement-makers and mechanicians would not be long in understanding all this if they were not under the supposition, received at second-hand by them, and therefore the more difficult to eradicate, that ploughing is a necessary form of cultivation to be kept in view. Once let the Q.E.F. be clearly understood by them, once let them be made fully to perceive that "ploughing" is merely the first of a long series of *means* towards the accomplishment of a particular end, that end being the production of *a seed-bed*, of suitable depth and texture, and with the soil as nearly as possible inverted in its bed, and I do not think they will be long in setting the steam engine about its proper task, in the proper way. But their attention is distracted at present from the end to the means. They are taught to think that the plough is a *sine quâ non*—that steam-cultivation of necessity implies steam-*ploughing*, and they are led to give up the task in despair, because they are at fault upon a false scent.

We have many *rolling* implements employed in the field, but we have only one instance of a *revolving* implement. The clod-crusher and the Norwegian harrow *roll;* the hay-tedding machine (one of the best instruments ever invented) *revolves*. I use the words somewhat arbitrarily, but the difference I allude to is very important. The first are liable to the evil of "clogging," because they derive their axis motion *from the soil* as they pass over and *press upon* it. This action must not be confounded with that of a machine which *has its cause of revolution within itself*, independent, and acting *upon* the soil as a circular-saw acts upon a board, or the paddle-wheel of a steamer upon the water. The teeth of a saw clear themselves, by the centrifugal motion they communicate to the particles they have detached from the substance they act upon. A circular "cultivator," steam-driven, will do the same, for I have proved it. It does so more effectually according to the speed (of revolution) and the state of moisture of the soil. This last incident is as it should be; for it is not desirable that a clay soil should be dealt with when in an improper state for cultivation; and one great advantage of such an instrument as I point to, would be that it would so immensely enlarge the choice of a suitable period, by its compendious accomplishment of the whole work of culture.

My object, however, at present, is not so much to advocate the particular mode of applying Steam-power which I myself suggest, as to explain again, and more fully, the grounds on which I feel more and more strongly assured that the attempt to employ it through the medium of the plough must be eventually renounced. I have left a great deal unsaid, to avoid prolixity; but propose, at another opportunity, to enter more closely into the subject. Mr. Way's admirable Lectures on "The Effects of Manures relatively with the degree of Disintegration of the Soil," read me a forcible chapter on the *Agricultural* bearing of the mode and means of cultivation I have hinted at, and on which a good deal had passed in my mind, from the peculiar notice bestowed on that passage of my work above alluded to, but which only went so far as to assert the superiority of the spade as a cultivator over the plough—a superiority which I am now far from thinking unsurpassable.

C. Wren Hoskyns.

Comparative Value of British and American Iron.—Most of our readers are, we doubt not, aware of the vast amount of the transportation on the Philadelphia and Reading Railroad, but few of them, probably, have reflected on the opportunity afforded by its vast business for testing the comparative durability of the different descriptions of iron—an opportunity probably unequalled in the world. For many years a record has been kept in relation to every single bar removed, showing the length of time it had been used, and its condition when removed, so that it can be at a moment ascertained how many tons' weight had passed upon it before it became so far worn as to render its removal necessary; and the result of the whole has been to establish the fact that true economy requires that American iron should alone be used for all future repairs, even at a much greater difference of price than now exists. That such is the case will be seen from the following facts:—

An English rail, weighing *sixty pounds* to the yard, requires ninety-four tons to the mile; the cost of which, at $40, would be $3,760. An American one, of *fifty pounds* to the yard, would require 78 tons; which, at $48, would be $3,744. Experience has proved the latter to be more durable, and in every respect better than the former, and, therefore, to be *much cheaper*, even at a difference of $8 per ton, or more than the whole of the present duty on foreign iron, whereas the actual difference is, as we learn, little more than $5 per ton. Nevertheless, English iron, cheap and comparatively worthless, is imported by hundreds of thousands of tons, and will, we doubt not, continue to be so until the remainder of our furnaces shall be closed, when prices will again rise, and probably to the old level.—*Republic.*

ENTOMOLOGY.

NO. I.

BY S. S. HALDEMAN.

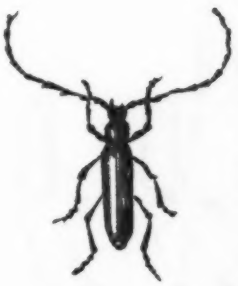


FIG. 1.

ENTOMOLOGY, or the study of insects, is interesting on account of the vast number of species and individuals, and the great variations exhibited in their structure and habits. Some are predacious, living upon other insects; some feeding upon decaying animal matter, and others upon decaying vegetables, these acting as scavengers to remove offensive matter. But the greater part live at the expense of vegetables, various species attacking every part, from the root to the seed.

It is chiefly with the last that the farmer, gardener, and forester are concerned, and in Europe the subject has been deemed of sufficient importance to call for national aid in making investigations and publishing histories of insects in their relations to man.

It is sometimes difficult to tell what insects are hurtful and what beneficial, and in some cases a species which was the destroyer of the real enemy has been mistaken for the cause of the mischief. Even when a destructive larva is seen, the perfect insect which comes from it may not be the species which the larva should have produced, because the natural enemies of some insert their eggs in the flesh of the latter, upon which their young feed. The attacked larva, before it dies, is often able to form a cocoon, and from this the parasite makes its appearance. For these and similar reasons it is necessary to have some knowledge of entomology to enable us to guard against the insects likely to injure us.

We intend to give an account of various insects in a series of articles of which this is the first; and although the history of some of them may seem to have no practical application, it must be remembered that a knowledge of any species may throw light upon others, and afford hints for their proper investigation. Most general works on natural science published in this country are devoted to foreign species which the reader may never be able to see, whilst the commonest American kinds are unrepresented. To remedy this defect, we have determined to give figures illustrative of American species and habits, taken from the specimens themselves.

FIG. 2.

ELAPHIDION PUTATOR, (FIG. 1.)—This is a small coleopter, (an insect with the true wings generally protected by hard wing covers or *elytra*,) of a brown color, with pale scattered spots. The antennæ are as long as the body in the female, and longer in the male. The larva lives in the small branches (generally in the centre) of oak, hickory, and chestnut, forming a flattened perforation some inches in length. The larva is a soft whitish grub, with stout black jaws, and when it has attained its full size (about the end of summer) it cuts the branch from the tree by a transverse cut, leaving the bark entire. The storms of the fall and the winter cause the branches to fall with its tenant; but previously to this, it has nicely closed the end of its perforation with a plug made of shreds of wood and sufficiently close to exclude water.

The annexed figure (2) represents a fragment of a branch of shellbark hickory which was probaly cut off by a different species, at both ends, with a plug (*b*) in each. It is cut open to exhibit the larva, which is represented at *a*. It has the anterior end large, somewhat as in the larva of BUPRESTIS. This enlargement disappears just before it changes to the pupa state, and most of the specimens are found in this condition about the middle of April in Pennsylvania. The larva has three pair of minute feet which assist it in moving along its burrow.

The fragments of wood which it inhabits are from two to four inches long, and the part to which it confines itself when it closes the ends is usually two or three inches in length. The plugs are usually inserted at the ends, although they are

Fig. 3.

Fig. 4.

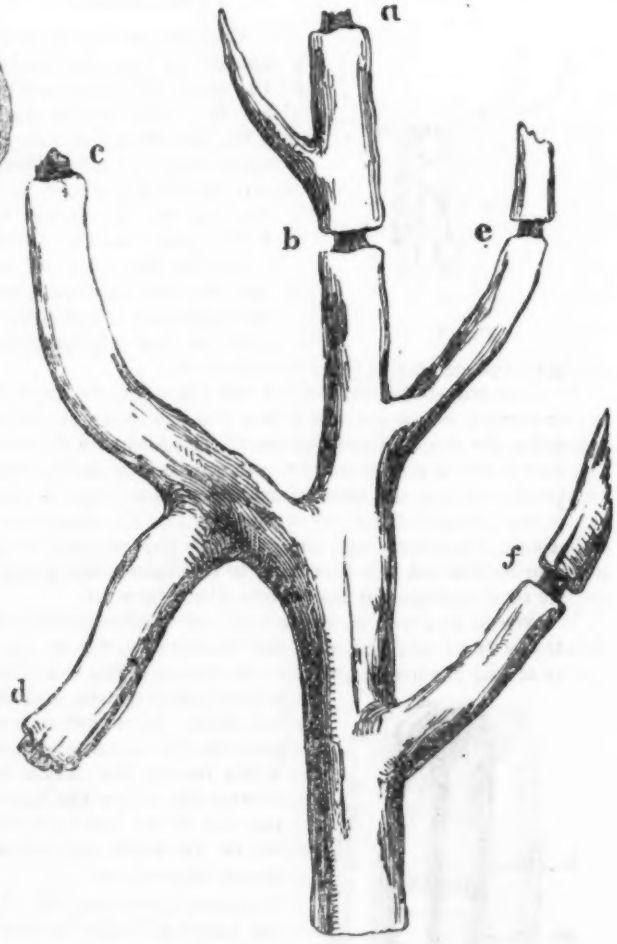


Fig. 5.

sometimes half an inch from them. The fragments cut off vary in thickness from the fourth of an inch to an inch, and figure 3 exhibits an end view of a thick one. The mandibles of the *imago* or perfect insect are sufficiently strong to enable it to eat its way out of the prison it had constructed for itself.

Oncideres Cingulatus.—This insect was first described by Say in the Journal of the Academy of Natural Sciences, vol. 5, p. 272, 1825, and its habits were discovered by us and published in our "Materials towards a History of the Coleoptera longicornia of the United States;" Am. Phil. Trans., vol. 10, p. 52, 1837.

In our walks through the forest our attention was frequently drawn to the branches and main shoot of young hickory trees, (Carya alba,) which were girdled with a deep notch in such a manner as to induce an observer to believe that the object in view was to kill the branch beyond the notch; and extraordinary as it may appear, this is actually the fact, and the operator is an insect whose instinct was implanted by the Almighty power which created it, and under such circumstances that it could never have been acquired as a habit. The knowledge of girdling is unknown to the insect, whose life is too short to perceive its effects and to foresee the necessities of its progeny during the succeeding season.

This insect may be seen in Pennsylvania during the last two weeks in August, and the first week in September, feeding upon the bark of the tender branches of the young hickories. Both sexes are rather rare, particularly the male, which is rather smaller than the female, but with longer antennæ.

The female makes perforations in the branches of the tree upon which she lives,

which are from half an inch to less than a quarter of an inch thick, in which she deposits her eggs; she then proceeds to gnaw a groove of about a tenth of an inch wide and deep, around the branch, and below the place where the eggs are deposited, so that the exterior portion dies and the larvæ feed upon the dead wood, a food which is essential to many insects, although but few have the means of providing it for themselves or their progeny by an instinct so remarkable.

Were this insect abundant, it would cause much damage to young forests of hoop-poles by the destruction of the principal shoot. We have known insects which, from their rarity, could hardly be regarded as "noxious," increase to such an extent as to be very destructive, and the locust trees (ROBINIA PSEUDACACIA) have had their foliage withered during the last few summers from such a cause. Should the insect in question increase so as to become troublesome, the infected branches should be cut off in July and burnt.

Fig 5 is a slightly modified representation of the top of a hickory tree, from a specimen now before us, which presents the unusual number of six girdlings, which were probably made in as many successive years. First the principal shoot at *a* was cut, and before the young shoot below it had acquired sufficient size to tempt an attack, the second cut *b* was made; then *c* probably followed, and a downward shoot *d* was the result; and this being cut, *e* and *f* may have followed. As the decaying portion which is not eaten by the larvæ is apt from its tender attachment and the rapidity of decay to drop off, truncated branches, like *c*, *d*, are frequently to be met with.

This insect is more than half an inch long, and of a brown color, spotted with yellowish, and varied with ashy, a band of the latter crossing the middle of the elytra, the base and end of which are reddish brown.

Guilding figures ONCIDERES AMPUTATOR in the Linnean Transactions, vol. 13, pl. 30, in the act of girdling a branch, but he did not discover the object of the proceeding. His figure is copied in *Insect Architecture*, page 240.—*Pa. Farm Journal.*

HOW WE PAY FOR TEA.

"THE imports into the United States from China, in 1844, amounted to $6,687,171, while our exports to that country were only $1,520,170—balance against us, $5,167,001. In 1849 our imports were $11,904,754, exports $1,490,945—balance against us, $10,413,809. In five years our imports increased fully 60 per cent., and our exports did not increase over 12 per cent. It appears that during the same period, that is, in 1844, the exports from Great Britain to China amounted to $35,929,132, while her imports were only $17,925,350—leaving a balance of trade against China of $18,003,782. The principal articles of export from Great Britain to create this large balance against China consisted of raw cotton and cotton fabrics; the raw cotton from British India, and fabrics from her home factories; both of which, and of a better quality, can be more cheaply supplied from this country."

It would be difficult to find a more happy illustration than is presented in the above, which we take from one of our exchange papers, of the system of the modern British politico-economical school, in which the late Secretary of the Treasury, Mr. Walker, is so distinguished a professor. Tennessee raises cotton and desires to purchase tea. Instead of converting the cotton into cloth, by the aid of the waste labor of her own plantations, and the waste water-power of her streams, and thus sending it abroad in the most compact and least expensive shape, she sends it, and perhaps the food to feed the workmen, in the most bulky and expensive form, to Manchester, that the one may be eaten while the other is being spun and woven. That done, the cloth goes to China to pay for the tea transported to the banks of the Tennessee—the labor expended in carrying the cotton back and forth being ten times more than would have been required to spin and weave it on the ground, and the capital employed being also ten times greater than would have sufficed for purchasing the machinery for spinning and weaving it.

So great a waste of labor and capital as is forced upon this nation by the anxiety of our Democratic friends to maintain the monopoly power of England is totally without parallel in the world, and our Southern friends would be satisfied of this, could they but be persuaded to study Adam Smith, and learn from him that the true place for the artisan is in that at which are grown the food and raw materials, making a market on the land for the one, and fitting the other for cheap transportation to distant markets.—*Republic.*

STRANGE ABSURDITY.

WHAT a strange absurdity it is to see silk going from China and France, cotton from the Southern United States, wool from Australia, coffee and sugar from Brazil, wheat from New-York, Michigan, Odessa, and Poland, hemp and flax from St. Petersburg, pork and lard from Ohio and Illinois, concentrating in Lancashire, to be returned in goods to the localities from whence they came! Such a state of things never could have been brought about but for the geographical position of England giving her the control of the ocean.

We place the above on record as a curiosity. It is from the pen of the editor of the *Democratic Review*, a staunch supporter of the system which looks to securing to England, now and for ever, a monopoly of the machinery for converting cotton and wool into cloth, in order that the people of Illinois and Ohio may continue to be compelled to send their corn and pork to Lancashire in company with the cotton of Mississippi and Alabama, "to be returned in goods to the localities from whence they came." It certainly is "a strange absurdity;" yet, strange and absurd as it is, our reviewer lends all his aid to perpetuate its perpetration.

NEW PROCESS IN THE MANUFACTURE OF SUGAR.

THE following, from a late number of the *Mark Lane Express*, may have interest for some of our Louisiana friends. Let us, by the way, inquire why it is that we meet with so little encouragement in that quarter? Is it that we have demonstrated that now they give five bales of cotton in exchange for one, whereas they ought to give but three, if they would force the loom to come to the cotton, instead of sending their cotton to the looms at Manchester?

SUGAR.—Several samples of sugar of a very superior quality, as respects granular texture and brightness of color, have recently attracted considerable attention in the Bristol sugar market, which has led to much inquiry as to the process of manufacture among the merchants and proprietors of West India estates. It appears from inquiries we have made, that, by a combination of several patents—among others, the cleansing and drying of sugar by centrifugal force—sugar which formerly took three or four weeks to refine, is now done in as many minutes. Sugars heretofore unsaleable in the English market are, by the new process, converted, as if by magic, into an article realizing 36s. ($8 64) per cwt. The machine by which the process is carried on, is very cheap, portable, and easily worked, and the raw produce shipped in a state which prevents the waste of some 12 to 15 per cent. in the shape of leakage from molasses. Next to the discovery of the vacuum pan, the improvement of Messrs. Fingal and Son, of Bristol, ranks first in the scale of importance; and they have happily succeeded in combining the interests of various patents held by Messrs. Seyrig, Hardman, Rotch, and others.

TO THAW FROZEN PLANTS.

To preserve vegetable life, after having been frozen, the same precaution is necessary as in the case of animals. Sudden elevation of temperature, by the application of heat, proves fatal in both cases. When the noses of French soldiers became frozen and lost all feeling, in their retreat from Moscow, they were preserved by rubbing them with *snow*. The restoration of vegetables frozen while alive is to be accomplished by the application of cold water, but not when the sun is shining on them. For

reasons that are here made obvious, early Yorks and other things should be planted on the north sides of ridges.

That portion of trees standing on the north side of a wall and rising above it, so as to be exposed in early spring to the action of the sun, has been known to be killed, while the residue, shaded by the wall, and therefore acted upon by the more gradual elevation of vernal temperature, has escaped uninjured; on the principle that is known, that, if a man's feet are frozen, he will lose them if plunged into hot water. *Verb. sap. sat.*

PROSPECTS OF THE FARMERS.

THE WHEAT CROP IN MICHIGAN AND INDIANA.—An extract of a letter, dated Sturges, St. Joseph county, Michigan, says:—

"The report circulating East, relative to a probably small wheat crop this season in Michigan, is wholly without foundation. The prospects for a very heavy crop were never so favorable in this State or Indiana as at the present time. Our road will groan this season with the freight. We are running down any quantity of wheat and flour now, and I think the new crop will come in as soon as the old is off, if not before."

As the growers of this grain will probably desire to know what are the prospects before them in relation to the "great grain market of the world," we give them the following extract from the Liverpool trade circulars of the close of April:—

The Corn market is very dull. Western Canal Flour, 19*s.* *a* 20*s.*; Wheat, 5*s.* 4*d.* *a* 5*s.* 8*d.* for red, and 6*s.* *a* 6*s.* 2*d.* for white; Corn, 30*s.* *a* 33*s.*; Indian Meal, 14*s.* 6*d.*

Transactions in Beef unimportant; Pork moves slowly; demand for Bacon not so active; Lard firm; Tallow has not varied in price; Cheese meets a moderate demand.

Western Canal Flour, in Liverpool, $4 56 to $4 80 per barrel; wheat $1 28 per bushel; transactions in beef unimportant, and pork moving slowly, while bacon is less active, &c.

In reading this, we beg them to recollect that it was for the purpose of obtaining such a market as this, that they were required to destroy the great domestic market furnished by the producers of coal, iron, and cloth. Had the tariff of 1842 remained unchanged, we should now be producing six millions of tons of coal instead of three; a million and a half of tons of iron instead of half a million; and we should be consuming eight hundred thousand bales of cotton, instead of five hundred thousand, and twenty million additional pounds of wool; and the *additional* value given to the raw materials used for these purposes would have been *one hundred millions of dollars*, every dollar of which would be the product of labor, and that labor representing the products of the earth in its various forms of food, clothing, and the use of houses, mills, and furnaces. Such is the market they have been required to sacrifice, in exchange for one in which they obtain for a barrel of flour $4 56, minus freight and commissions. How long will it be before they will learn that the tendency of the present system is to build up the *middleman* at the cost of both consumer and producer?

HOW TO SMOKE A GREENHOUSE EFFECTUALLY.—Take a sheet of touch paper, spread it out, and roll half an ounce or one ounce of tobacco up in it, light it at both ends, put it into the house, leave it there, remain outside with your hands in your pockets, and the job is done. In the morning all the green flies will be dead.—*Edward Huggins, Boston, Lincolnshire.*

FLAX COTTON.

A SPECIMEN of flax cotton has been prepared by Mr. Hayward of Buffalo, a gentleman of great experience in flax culture, who is confident that he can produce the article in a large way for six cents per lb. The material is not bleached, but in all other respects has the appearance of fine Sea Island cotton, and feels like it.

From the North, the East, and the West, we have accounts of successful efforts on the part of our own countrymen for the preparation of flax to be used as a substitute for cotton, and from England we learn that various large mills have made extensive contracts for supplies of this material. Nevertheless, we are not yet satisfied that this revolution is so near being accomplished as these various accounts would seem to indicate. A great revolution it will be whenever it shall come, for the immediate effect will be that of enabling Russia and Germany, and other countries of Europe, not only to grow, and spin, and weave flax, thus making a market on their land for its products; but also to enter into competition with the South for the supply of Great Britain, whom Southern policy has encouraged in her efforts to secure to herself a monopoly of the machinery for converting cotton, or flax cotton, into cloth. Although we do not yet believe that this revolution is so close at hand, we cannot forget that

"Coming events cast their shadows before;"

and we cannot but believe that what has already been done is but preliminary to the last great act in which the work so long desired, and for the accomplishment of which Napoleon offered so large a reward, will be accomplished. At all events, it seems to us that the time has arrived for the planters to ask themselves, what will be their position if it should happen to be accomplished? Instead of seeking to attract the cotton machinery to their own cotton fields, they have kept it at a distance, and it is now every where located among the people of flax-growing countries, who will then produce flax more cheaply than they can import cotton. It may be that the evil cannot be remedied—that the time of trial is at hand. It may, however, be otherwise, and years may yet elapse before flax shall be spun on cotton machinery. If so, should they not at once determine upon a change of policy, and place themselves in a position to enable them to ship cotton cloth to all the nations of the world, instead of cotton? That, however, they can never do under the tariff of 1846, which is daily diminishing the home consumption of cotton, and increasing their dependence on the flax-growing people of the world.

NEW FLAX-BLEACHING PROCESS.

WITH regard to the question whether the new flax-bleaching process of M. Claussen will adapt that material to the machinery used for spinning cotton, on which we inserted a letter from a correspondent a fortnight back, the *Manchester Guardian* of Saturday has the following remarks:—

"With reference to the alleged discovery of a process for preparing flax so as to render it suitable for spinning on cotton machinery, we feel bound to say, that notwithstanding the repeated statements to that effect, we cannot learn that a single ounce of yarn has been spun on cotton machinery from flax prepared by M. Claussen's process, either in Manchester or in the neighborhood. All that we can ascertain is that one attempt has been made near Ashton-under-Lyne which failed entirely; that a firm of fine spinners near Bolton, who had been requested to make another experiment, were satisfied when they saw the material that it was altogether unsuited

for their machinery, and that it has been sent to a firm of spinners and manufacturers at Rochdale, who have not, we believe, yet made any report upon it. All we have heard upon the subject from parties who have seen the material has tended to confirm our previous impression, that as a substitute for cotton it is likely to prove an entire failure, except possibly in the production of very low and coarse yarn, to which it may prove to be to some extent applicable. For all finer purposes it is unfit, not only by its general coarseness of fibre, but by its harshness and elasticity, which must always prevent it from making a fine and even thread when spun on cotton machinery. So far, therefore, the difficulties which have prevented the success of former attempts to substitute flax for cotton have not, in our judgment, been removed."

And with reference to an analogous process in which a priority of invention has been claimed by a Mr. Slack of Renfrew, it is added:—

"Both are, as it seems to us, equally unsuitable for cotton machinery, and, so far as we understand the statement on behalf of Mr. Slack, he does not claim for it any such capability. It appears, however, exceedingly well adapted for the production of fine yarn on ordinary flax machinery—the fibres being minutely separated from each other; and we have seen some very beautiful yarn which was stated to have been spun from it by the ordinary process in the north of Ireland. The process it has undergone also appears to have made some chemical change in it, which renders it more capable of being dyed bright colors. Flax is generally, we believe, the most intractable material with which the dyer has to deal; but the flax prepared by Mr. Slack's process seems to take readily a number of bright and delicate colors; whether fast or not, we are unable to say. In all this, however, the bulk of our readers will find comparatively little interest. The discovery of any material that would serve as a good substitute for cotton, and diminish our dependence on the precarious seasons of the cotton-growing States of America, would indeed be important to them; but for any such discovery they must look, we imagine, to other sources than the patents of M. Claussen and Mr. Slack."—*Times.*

A Hoosier Pig.—Mr. James Rogers, of Monroe county, Indiana, slaughtered a pig only seven months old, which weighed net 215 pounds. It had no extra care or feeding.

If early growth, fatness and weight be the object, why go to England for pigs—except from the long habit of going there for every thing? The Americans in attendance at John Bull's great show in May will not be less than 10,000, and will leave there, on an average, $100 each, a million of dollars! Mr. Van Buren, the friend of "free trade," appointed by the New-York State Agricultural Society, at the head of its commission to visit the Show, declines attending. Perhaps, with his well-known sagacity, he foresaw that the Government of England was about to be forced into an abandonment of the ruinous system of admitting agricultural produce *free*, for the sake of enabling John Bull to continue to supply the whole world with his machine-made products, in exchange for their products made by hand power? We trust the commissioners from the State Society will be instructed to report on their return the effect of free trade on the agricultural interest, and how far it is wise in American farmers, as recommended in Governor Wright's address,—posthumously delivered and published by that Society,—to depend on competition with the world, in the great grain markets of the world. A system under which, we are told by a gentleman pronounced to be "at the *head* of a profession he so much adorns," the agriculture of New-York has been constantly, and is still declining. No wonder it is—and so it will continue to do, as long as we surrender the home market in a vain ridiculous attempt to compete against the down-trodden, half-starved labor of Europe, in the great grain markets of the world,meaning Mark Lane, Cheapside, London! Ah! we are a most wise—a most wonderful people.

A MAN OF BUSINESS.

At the Greene County, New-York, Agricultural Fair, an address was made by Colonel Zadock Pratt, from which we take the following passage:—

And now I will show you the advantage those dreary hemlocks have been to the farmers of our mountain towns. Since I first engaged in farming, it has been my lot to employ over fifteen thousand years of other men's labor: an army of thirty thousand men have I employed, and I have paid those men, for their labor alone, over two million five hundred thousand dollars. I have cleared over ten thousand acres of land, used over two hundred thousand cords of hemlock bark, and paid over half a million of dollars for it. Used and worn out five hundred horses and one thousand yoke of oxen. Used two hundred thousand bushels of oats, one hundred and twenty thousand tons of hay; thirty thousand barrels of beef and pork, and nearly one hundred thousand barrels of flour, and potatoes without number or measure.

I have tanned one million two hundred and fifty sides of leather; my usual disbursement is over five thousand dollars per day, and I have used in my business here over ten millions. Every laborer received his money, yea, every man his penny, in peace; and to the credit of this community be it said, that I never had a side of leather stolen, and never was chosen defendant in law on account of my business transactions, during my residence among you. The great object of my living is to be useful. Live with your neighbor, and not on him. Allow me, gentlemen and ladies, to conclude by congratulating you upon the rich blessings of health, power and prosperity which surround you; and may succeeding generations do as much as you have towards national wealth and industry, which are the safeguards to our independence.

We desire particularly to call the attention of our agricultural readers to the extraordinary facts contained in the above extract, as strongly illustrative of the advantage resulting from bringing the consumer to the side of the producer. Throughout the country men are every where engaged in destroying timber, while sending their hides to a distance to be tanned. One of our friends wrote us some time since that he had offered forty dollars an acre to have his land cleared, but that the timber was so heavy that he could find no one to undertake the job. If such men were once to determine to use their own home-made iron, and home-made cloth, and shoes and saddles, they would speedily find a market for their timber, in which they would *receive* for it as much as they now *pay* for its destruction. That market they would now have, had the tariff of 1842 been maintained, for its object was that of making every where a market on the land for the products of the land.

HOW VIRGINIA POLICY AFFECTS VIRGINIA INTERESTS.

A little more than eighty years ago, says the *Richmond Republican*, the imports of Virginia amounted to $4,085,472, and those of New-York to $907,200. In 1849 the imports of Virginia amounted to $241,935, and the exports in domestic produce, $3,363,422; the imports of New-York to $92,567,369, and her exports $36,738,215.

Such facts as these cannot be too frequently repeated. *They are burningly disgraceful; but if a red-hot coal on the back of a terrapin will start him on his travels, it cannot be applied too soon or too often.*

We cannot but rejoice to see that our Southern friends are at length opening their eyes to the destructive consequences resulting from the separation of the plough, the loom, and the anvil. But half a century since,

Virginia stood at the head of this great confederacy; but from that time to the present she has been steadily sinking in the scale, while other States have been as steadily rising in it; and from day to day free trade, as it is the fashion to call the monopoly system of England, has been rendering her more and more tributary to her neighbors and to England. The reason for all this is to be found in the fact that Virginia has made no market on the land for the products of the land, and that her farmers have therefore been enabled to return to the soil no part of the refuse of its products, which has therefore been impoverished, and its owners have been compelled to seek new soils, to be again exhausted. In exhausting their soils, they have been wasting their capital, and they are now surprised to find that they are poor; yet are they not prepared to adopt the true and only remedy, by aid of which they can be enabled to enrich their land and themselves.

New-York imports hides, and by aid of the bark of her forests converts them into leather, and her mechanics convert the leather into shoes, saddles, harness, and a thousand other things that aid in making cargoes to be exported for the payment of the men who produce sugar, coffee, hides, and other commodities required for our consumption. Her land is thus cleared, new farms are created, and her population and her commerce are both increased. Virginia leaves her trees on the ground until they decay, and she sends her hides to New-York to be tanned, while her cleared lands are abandoned by their owners; and she then wonders that her population and her commerce both diminish. It is time that she should awaken to the fact that diversification of employment is indispensable to prosperity, and that to give her that diversification was the object of the tariff of 1842, in the destruction of which her representatives so largely aided.

AGRICULTURAL IMPROVEMENT OF POOR SANDY LAND IN ENGLAND, LIKE THAT IN EAST JERSEY.

It was lately stated publicly at a meeting of an Agricultural Society, that there were men now living who could remember when 40,000 acres of land, belonging to the late Lord Leicester, in Norfolk, which are now worth £40,000 ($200,000) a year, were nothing but rabbit warrens and barren heaths. Lord Yarborough had 30,000 acres of land in Lincolnshire, which formerly let at 4*s.* 6*d.*, ($1.10,) and at this low rate ruined almost every one that rented it. This same land now rents for $6 an acre, to farmers who are making large fortunes, (that was in 1845,) many of them keeping their carriages.

The Reverend lecturer, Doctor Buckland, went on to say, that it was the custom for Lord Leicester, when applied to for a farm, to ask the applicant *how much capital he had.* "I have farms," he would say, "of all sizes, for every amount of capital, from two thousand down to two hundred acres."

It was not surprising, said the Reverend Professor, that that farmer could not succeed, who, having a capital of *only* $5,000, took a farm that required £2,000, or $10,000.

The want of capital in this country in the hands of the owners of the fee simple, is a great drawback on agricultural improvement. It is as

necessary to put the land in motion, and to give activity to it, and profit to the labor applied to it, as it is to put the wheels of a manufactory in motion, or to start a ship on her voyage.

HIDE NOT YOUR LIGHT UNDER A BUSHEL.

"That learning, whatever it may be, which lives and dies with the possessor, is more worthless than his wealth, which descends to posterity."

In reading, some days since, a memoir of Buckminster, the celebrated preacher, we were struck with the sententious force and truth of the passage quoted; and could not resist the inclination to record it, for the benefit of those farmers and planters whose habits of close observation, and whose sagacity, have enabled them to impart instruction in the practice of their pursuits. How readily we all unite in reprobating the meanness of those who lock up their large possessions, spending their days in wretched anxiety about further accumulations, and in fear of some pecuniary reverse that may diminish the wealth they have not spirit to use for the good of society, or the relief of the wretched!—and yet in what respect does the wretched miser differ from him who hoards up knowledge, that, if imparted, might be the means of increasing the comforts of his fellow-beings? Let the farmer, then, who sees any thing which he knows to be wasteful or erroneous in the use of agricultural capital or labor, remember, "that learning, whatever it may be, which lives and dies with the possessor, is more worthless than his wealth, which descends to posterity." The best way for the farmer to transmit his knowledge to posterity is to commit it to paper, and hand it over to the Editor of an Agricultural Journal, of which there are so many ready and willing to receive and distribute it.

ON THE LOVE OF FLOWERS, AND A TASTE FOR GARDEN SCENERY.

There is nothing we envy more, the loss of which is more to be deplored, than the taste which was once entertained (with the means to indulge it) in the old Atlantic States for the *care and cultivation of their gardens.* Even we can remember, when all the best families in Calvert county, Maryland, cultivated roses, and honeysuckles, and lilacs, and fleurs de lis, and pinks, and tulips, and the snowball, and the mock orange, (in which the little sparrow "built his nest,") and the flowering almond, and various lilacs, and thyme, and sweet-william, and currants, and gooseberries, and plums, and pears. Scarcely a garden was without some or most of these. What has become of them, and of the taste that demanded them? By what have they been superseded? By a few straggling cabbages and a few potatoes, and by a love of party politics and liquor! A modern writer well observes:—

The main argument for enforcing attention to such seemingly unimportant considerations as the above—unimportant in the estimation of a cold, calculating age like the present—rests on the fact, that a taste for the beauties of garden scenery

is of high value when found existing in the minds of those individuals who, in a collective capacity, constitute a nation. The innate and immortal faculties of man, which may be largely gratified in a future state of existence, and which, even in this life, render him capable of receiving pleasure in the contemplation of beautiful objects, repay their cultivation by tending to the production of a refinement in manners, both in the case of nations and individuals. It is universally admitted that a love for flowers, or for other objects of natural beauty, indicates a degree of refinement in that bosom where it predominates and is cherished; and the authentic pages of history inform us, that in all ages a national taste for gardening, architecture, and the fine arts, has been a sure sign that civilization was gaining the ascendant over former barbarism. It becomes, then, a national object, to foster and provide for the gratification of feelings of desire after the pleasures afforded to the mind by those two great principles of landscape gardening—beauty and harmony.

EFFECT OF MECHANICAL PURSUITS UPON MIND.

I DO not wonder that great men have been born mechanics: for those who have been brought up exclusively in drawing-rooms, intelligence is a game, a recreation; for those who have held the sword or the helm, who have driven the plough or worked with the chisel, intelligence becomes a passion, a force, a beauty, a worship, a love divine. It is from the stall, the shop, the work-room, that the most powerful minds have issued; Molière from the upholsterer's, Burns from the farmers, Shakspeare from the hosier's shop, Rousseau from the wheelwright's. Long engaged in a struggle with physical nature, they all took refuge with joyful enthusiasm in the free domain of thought. Even an inferior mind would become tempered to strength in these mechanical apprenticeships; and if ever the spirit of reform which is seizing on the world should extend to the act of creating citizens, I doubt not that good sense will gain a victory over custom, and that one of the most important parts of every education will be henceforth the due admixture of the development of the mind and of its action on the elements of nature.

The above remarks are from the pen of M. Chastel, a distinguished French *savant*, who rose to eminence from the humblest mechanical station; and we commend them to the careful consideration of those of our readers who may still retain any belief in the doctrines which led to the passage of the tariff of 1846, and which teach that we are bound to remain an agricultural nation, dependent upon the people of Europe for the use of the machinery required for converting our food and our wool into cloth—and our food and *their* ore into iron. A purely agricultural population is necessarily a scattered one, in which there can be little exchange of thought; and when such exchange does not take place, there can be little improvement of thought. A scattered agricultural population maintains, with great difficulty, very poor schools. Diversification of labor enables more people to live on the same surface, and with each step in that direction the schools increase in number and quality, with with a constant diminution in the difficulty of maintaining them.

ON THE PRINCIPLES OF BEAUTY IN RURAL SCENERY.

A MODERN writer observes: The grand characteristic of picturesque park scenery is quietness and repose, or what may be termed the passive sublime. The changeless green of the smooth grass tends to the production of this expression; an expression that is in vain sought for in scenery where the ground bears the marks of having been disturbed by the spade or the plough. Trees form a principal ingredient in park scenery—and more especially native old trees, as distinguished from young species of foreign origin, protected by artificial means, such as wooden or iron railings. The waving motion of branches and trembling of leaves add to the character of sublimity possessed by aged trees, and detract not from that quiet repose

which the presence of moving objects of an artificial kind is sure to destroy.* The feelings, associated with the presence of trees that have for ages withstood the raging of the tempest, are of a highly conservative nature, and are fitted to excite veneration for long-established laws and usages. The presence of cattle or sheep is favorable to an expression of repose, whether they be in a moving state, or resting under the shade of trees. They also impart a cheerful appearance to the landscape; and, lacking their presence, an otherwise beautiful scene is liable to partake of dulness. Immovable artificial objects, such as houses and bridges, are admissible in quiet rural scenery, inasmuch as they interfere not with an expression of repose. But clear and still, or smooth-flowing water, is the centre which unites such scenery in one grand whole. The effects of clear, smooth-flowing water, in a landscape, are thus described by Homer:—

"And where Piëra, rolled through banks of flowers
Reflects her bordering palaces and bowers."

The associations connected with still water are familiar to the mind of every one, and have been thus beautifully clothed in language by Scotia's ancient bard, in portraying the countenance of a mighty chief who had been slain in battle:—"When thou didst return from the war," says Ossian, in lamenting the death of Morar, "how peaceful was thy brow! Thy face was as the sun after rain; like the moon in the silence of night; calm as the breast of the lake when the loud wind is laid."

THE DESTRUCTION OF WOODLICE.

Most gardeners are much annoyed with woodlice. They breed in heat both winter and summer, and they possess an appetite of the most accommodating kind. It matters not whether it is the blossom of the Cucumber or that of a Pine-apple that comes in their way, the fruit of a Melon or that of a Cucumber; they will eat the nauseous leaves of the Lisianthus Russellianus with the same relish as they do Mushrooms, Carrots, Parsneps, Beet-roots, Scorzonera, and Salsify; they like for their salad Chicory leaves, which are not a bit too bitter for them. I have lost many an ounce of Strawberries through their depredations, and also many an early Cucumber that would have brought me 3s. 6d. in the market. The means I have employed for their destruction have been toads, which are effectual; but they are expensive, being 4s. a dozen. Many of them die, and except they are kept in quantity, the woodlice cannot be kept down. I have also tried pots with hay in them, Carrots, sliced Turnips, Cabbage leaves, bread, poisoned ditto, poisoned Turnips, and boiling water, when it could be used. As to the time for destroying them, we all know that if we kill a wasp in spring, thousands are at once destroyed. It appears, then, that the best time to kill woodlice is towards August, when they have ceased breeding, and are spread all over the grounds; attack them then before they return to their winter-quarters, to which they repair with alacrity when roused. I once formed a Mushroom bed parallel with an old deal fence; but, as might have been anticipated, I did not gather a single Mushroom; every time the bed was uncovered, the woodlice made over the ridge for the fence with great speed.

My object now, however, is to state that, from some trials I have made, I am convinced that woodlice may be killed by the use of bantam fowls. This plan may be put in operation by any one, even at this time

* Who that ever underwent can forget the influence oft produced by a solitary walk in the forest, at Buena Ventura, near Savannah, so beautifully described in Bryant's celebrated Forest Hymn?

We believe the ground has been lately dedicated to the appropriate purpose of a cemetery, by the spirited and gentlemanly proprietor of the Pulaski Hotel.—*Ed. P. L. & A.*

(December) of the year. I first had a hundred woodlice caught at a rubbish heap, and gave them to three bantams; they ate them up in something less than two minutes. I had these birds in attendance when turning over a rubbish heap, and not a woodlouse was allowed to escape, nor any insect, the bantams devouring every thing. It will thus be seen that if bantams were encouraged and brought up in gardens, they would effect much good; and I am of opinion that it will soon be found to be as necessary to keep bantams to kill vermin, as it is to keep cats to keep down rats and mice. They will save various crops from injuries to which otherwise they would be exposed. They would scratch a little, to be sure, but so do cats, and if the smaller kind of bantams are kept, (those about the size of a partridge,) their scratching would do little harm. The reason why gardens are generally nurseries for all sorts of insects is, because they are guarded by cats, traps, nets, &c., in such a manner that no bird can approach them. If it were not for the wild birds of the fields, the farmers' crops would be eaten up with vermin; and I think that birds have as much right to a little of the fruits of this earth as we have, for helping to keep destructive insects in check. It will be the gardener's own fault in future if he is much troubled with woodlice.

The above was written last December. This spring I had a temporary cage placed at the end of a twelve-light cucumber pit; a brick was driven out in order to allow the ingress and egress of a large brood of bantams. I had those for this experiment from a fancier of the name of Dawson; they ate up every insect in less than a week. Another year, I intend to have a hole in all the pits, and move the young bantams from one pit to the others. I have a rubbish corner where all the rakings, leaves, and general refuse of the garden are put. This place is inclosed with four feet laths all round, and a brood of bantams was put there. This was at one time the grand breeding place for all sorts of insects; but now it is the most valuable corner which I have. The moment an insect comes to the surface, it is eaten up. I have had three full-grown bantams at large nearly all the summer, (Sir John Seabright's Silver Spangled;) and to see those birds, with their hawk's eyes, walking about through the sheds, houses, mushroom places, up and down the alleys of the pits, &c., picking up every crawling insect, is very satisfactory. One bantam is worth fifty toads. I do not mean to say that in a general kitchen garden, it would do for them to be at large at certain seasons; but even then I should make them quite welcome to a few cabbage or lettuce leaves, for the great benefit that is to be derived from their destroying every sort of insect, except the slug and snail, which a few young ducks in the autumn and spring would soon remove.—*Cuthill.*

PROPAGATION BY LEAVES.

I HAVE been in the habit for the last three years of raising Camellia stocks from leaves, and I consider the plan an excellent one. The Camellia pæoniflora, being the strongest growing sort with which I am acquainted, is the one I select for the purpose. In March, with a sharp knife, I cut off as many leaves close to the branch as I want, taking, of course, the buds off with them. The leaves are potted immediately in 48-sized pots, in peat and sand, and are placed about one third their depth into the soil, and the pots are then plunged into a tan-bed, where no fire-heat is

employed; they are covered with a hand-glass, kept moderately moist, and shaded when necessary. These leaves strike root, grow vigorously, and in two seasons make good stocks for grafting on. This mode of raising Camellia stocks is very convenient, for it is often easier to procure leaves than grafts, and the plan answers well when leaves are sent from a distance. In April, 1843, a blossom of a new double Camellia was sent to me; it had travelled upwards of 300 miles, and was so dry that I could not discover its color; there were, however, two or three leaves attached to it, one of which was treated as above, and I have now from it a very strong plant, 5 feet 6 inches in height, producing nine flower-buds ready to expand. The plant has been stopped twice in order to cause it to throw out branches, which are now eleven in number; the circumference of the stem is 1½ inch at the bottom. I likewise raise Orange stocks in a similar manner; the leaves are cut off in August, and are potted, but not covered with hand-glasses. The stocks which I use for Orange grafting are Citrons, which, being strong growers, make excellent plants by the following summer. The Citrons, I imagine, may however be grown much quicker by putting in the leaves in February instead of in August. I have no doubt that the plants will be sufficiently strong to be grafted by the end of July or early in August.—*J. Markham, The Gardens. Hewell.*

GRAVEL WALKS AND ROADS.

In the very humid and comparatively sunless climate of England, nothing conduces more to the enjoyment of a country residence than a good, firm, and dry walk, upon the surface of which the ladies of a family can, without annoyance from dirt or damp, take their daily exercise. To be what it ought, it should be available immediately a heavy shower has ceased; and to this end it is desirable to get a hard, smooth surface, and to carry off the surface water by frequent gratings to an underground drain, not allowing it to saturate the materials of which the walk is composed, or the ground on which it rests; because in proportion to the absorbency of the materials will be the unsoundness of the walk after severe frosts. Both road-making and walk-making are frequently ill understood by those who attempt it.

In the ordinary course of proceeding to form a road or walk, it is usual to make a deep excavation, which, when filled (as is usual) with large and coarse gravel, becomes a receptacle for the drainage of the adjacent ground, thus securing the greatest evil which can happen, by the constant saturation of its foundation. A better plan is to raise the edges of it above the adjoining surface, which keeps it dry. It is necessary that there should be six inches in thickness of gravel, for otherwise, however firm and good the surface might be, the worms would cast through and disfigure it.

Nothing can be a worse practice than the employment of large bodies of rounded pebbles at the bottom of a road or walk. After all, it is the native soil which carries the road, and if this is covered or roofed with materials which exclude the surface water, it will last; four inches of hard materials is sufficient; if pebbles, they should be broken so as to form a compact solid body, which they do when angular. Rounded pebbles, independently of the facilities which their interstices afford for the lodgment of water, are ever rising upwards; when pressed upon any point of their circumference, they move and become wedged by the falling of finer materials around them; and as this is always going on, in time they get to the surface, making it rough and uneven. In no instance should any great amount of convexity be given to the surface of a walk; its crown should not be raised above the level of the margins; if the water will just fall to the sides, where the gratings are placed, it is all that is necessary; its outline cannot be too accurately defined; it is avowedly a work of art, and should have the impress of the nicest artistical execution in all its details.

However good the material which forms the face of the walk may be, the

action of the atmosphere, alternate frosts and rain, will in time decompose the surface, in the same manner as it decomposes the hardest rocks, and by its slow but sure agency effects vast changes in the surface of the earth; the particles of earth absorb water, they expand by freezing, and when they thaw, become soft and friable, presenting a fit nidus for lichens, mosses, &c., to vegetate in; but with a well-made walk we have only to scatter a little bright and fresh gravel on the surface, previously loosening it slightly, and it is restored to its former beauty. I have long discontinued the old practice of breaking up the walks deeply; and the more ancient one of leaving them roughly broken and exposed to the frost, snows, and rains of winter, cannot be too highly deprecated.

Asphalte and paving have both been recommended for forming garden-walks, but I think there are few persons who would not prefer the bright warm color of good gravel, where it can be procured. I have been in the habit of forming a sort of concrete with the gravel we get here, which answers well; it is well watered and rolled to the consistency of puddle when wet; it is afterwards allowed to dry, and sets as hard as a rock—the first shower of rain restoring it to its natural appearance.

Walk-making, if well done, is very expensive; of course varying with the facility of obtaining fit materials; so much depends on their proximity to the scene of operations, or having to be carted from a distance, that perhaps no two places would come under the same estimate. Both walks and roads should be made upon the same principle—that of preserving a moderately thick stratum of angular materials from absorbing the surface water; and yet so little is this understood, that thousands of tons of stone are yearly thrown into deep trenches, to form, as it is supposed, the foundations for roads and walks, while at the same time they, instead of supporting them, secure the most effectual means of making them unstable and rotten. Let a dry surface be obtained—if not naturally, artificially—and cover it with a thin coat of such material as will keep it so.

In the present depressed state of the agricultural interest, this may be worth the consideration of such of our friends of that class as purpose making roads; because, the principle admitted, must cause a much less quantity of ponderous materials to be procured and hauled than is usually done in forming farm-roads; and as economy is the order of the day, this is one item in which a saving of outlay may be made where such labor is necessary. Whether it be in an approach road to the residence of a gentleman, or upon his farm, or in his garden, nothing is more satisfactory than well-kept roads and walks. In the wilder scenes of nature we can admire rugged and irregular paths, but in what immediately relates to the comfort and enjoyment of the family of the man of wealth and taste, we look for perfection, as far as it is attainable by human means.—*Henry Baily, Nuneham.—Gardener's Chronicle.*

CURE FOR A BELLOWSED HORSE.

Some few weeks since, being overtaken by a severe thunder-storm on my way home, I took refuge under a shelter where were assembled several gentlemen, from the same cause. One of the gentlemen, a stranger to me at the time, thus accosted me:

"Why do you not cure your horse of the bellows?"

"For the very reason that I cannot," I replied.

"Well, stranger," said he, "when I am at home I cure all such cases, and warrant them, at $10 a head; but as I am a long way from home, and your horse is a valuable one, I will tell you how to cure him effectually in a few days. In the first place," says he, "give your horse salt in his water, for three mornings in succession; after that, pound up a piece of blue-stone about the size of a chinquapin, and mix with wet meal; give him the same quantity for ten consecutive mornings, feeding him rather lightly for ten days, and if he is not a well horse at the end of ten days, I'll give you my head."

I have tried the remedy, and it has wrought a perfect cure, and now give it to the readers, that they may save their horses and their ten dollars too.—*Exchange Paper.*

HOW TO SUBDUE A VICIOUS HORSE.

A correspondent of the *New-York Commercial* gives the following account of the method adopted by an officer of the United States service, lately returned from Mexico, to subdue a horse who would not allow his feet to be handled for the purpose of shoeing:

He took a cord about the size of a common bed-cord, put it in the mouth of the horse like a bit, and tied it tightly on the top of the animal's head, passing his left ear under the string, not painfully tight, but tight enough to keep the ear down, and the cord in its place. This done, he patted the horse gently on the side of the head, and commanded him to follow, and instantly the horse obeyed, perfectly subdued, and as gentle as a well-trained dog; suffering his feet to be lifted with entire impunity, and acting in all respects like an old stager. The simple string thus tied made him at once as docile and obedient as any one could desire. The gentleman who thus furnished this exceedingly simple means of subduing a very dangerous propensity, intimated that it is practised in Mexico and South America in the management of wild horses.

NEW BOOKS.

The American Miller and Millwright's Assistant. By WILLIAM CARTER HUGHES. Philadelphia: Henry Carey Baird, successor to E. L. Carey. Pp. 220.

This is another volume of Mr. Baird's Practical Series, and one that we should think is much needed, as there is no recent American book on the subject. Here the Millwright and the Flour Factor will find much valuable information, illustrated by engravings, and all at a low price.

The Turner's Companion; containing Instructions in all the various Operations in Turning. Pp. 135. Philadelphia: Henry Carey Baird, successor to E. L. Carey.

Here is another of the same series. The art of Turning is a beautiful one, and the little volume is well worth a perusal, not only by the practical turner, but by all who, either from amusement or otherwise, take an interest in the subject. Illustrated with many engravings.

The Manufacture of Steel; containing the Practice and Principles of working and making Steel. By FREDERICK OVERMAN, author of the "Manufacture of Iron," &c. &c. Philadelphia: A. Hart, late Carey & Hart. Pp. 226.

Useful books seem the order of the day. Here is another capital volume. Books on the manufacture of iron and steel have been much wanted in this country, and heretofore there has been nothing but expensive English books to supply the want. We are glad to see that publishers are turning their attention that way. We do not doubt, from the reputation of the author, that this is a capital book.

Wild Sports of the West. By WILLIAM H. MAXWELL. Philadelphia: T. B. Peterson. Price fifty cents.

The author of "Brien O'Linn" and "Hector O'Halloran" has here given us another of his capital books. Running over with humor, but at the same time chaste, it is just the book to keep off the "blues."

The Banker's Wife; or, Like Father, like Son. By T. S. ARTHUR. Philadelphia: T. B. Peterson. Price twenty-five cents.

The name of the author is sufficient recommendation for this book.

FATTENING CATTLE.

A DISSERTATION ON THE PHILOSOPHY OF FATTENING CATTLE....PART I.

NEXT to understanding properly the chemical analysis of soils, the application of proper manures, and the crops which should be grown from the land by proper tillage, there are but few subjects more deserving the attention of the practical agriculturist than a knowledge of the proper connection which exists and should be duly preserved between the members of the animal and vegetable kingdoms. As I observed in my Lectures on the "Philosophy of Agriculture," so may I now repeat, man is an omnivorous animal—he is destined by the Almighty, who has so created his masticatory and digestive organs, that he can live and flourish under a compound diet of animal and vegetable food; we are also told, by Divine authority, that "*man shall not live upon bread alone;*" consequently, as it is necessary that he should have recourse to substances of a different nature to use in combination, so is it equally of paramount importance that he should direct his care, skill, knowledge and attention to the management of cattle, so that they should be able to afford him the greatest possible amount of nutritious food, and at the least possible expense in money to himself, and waste or loss, or both, in the preparation of the same.

It is my intention in the present Lecture to make a few observations on this subject, to show you the wisdom that experience has taught us, and which I have drawn from many sources, the results of the labors of practical men. To some I may have the pleasure of addressing, the theme I shall discuss may be novel; while I doubt not that many who are here present will be able to confirm many of the truths which I shall utter.

The existing link between animals and vegetables forms one of the most beautiful chains in Nature, and one which cannot be dissolved; it is one of the greatest value to the practical farmer, because it so materially affects his operations in the breeding, rearing and feeding his cattle.

In considering this subject philosophically, we must first of all examine what are the substances which enter into the office of nutrition, and ascertain by what means, as far as our limited knowledge extends, nourishment is afforded to the animal. The vegetables upon which not only cattle but ourselves are fed consist of two portions, viz. an organic and an inorganic; and, upon instituting a chemical analysis, we find that the organic is chiefly composed of a considerable quantity of water, much carbonic acid in combination with the salts of ammonia, and nitric acid; the inorganic portion is entirely derived from the soil from which they grow, and the science of Chemistry informs us that it consists almost entirely of the various saline constituents, and earthy particles, which, upon incineration or burning, constitute the ashes of the plants. I refer you to what I stated in my Lectures on the Philosophy of Agriculture, as to the manner in which these particles are absorbed by the plants, and which you will find published in Nos. I. and II. of "THE PLOW," detailed at length; but I may here briefly remark that these substances are taken into the texture of the vegetable by means of the leaves and roots, which, under the chemical action and influence of the light from the sun, are decomposed—the oxygen becoming returned to the atmosphere which originally gave it; while the elements of water, with the carbon, unite to form starch, sugar, gum, or woody fibre, and with the elements of ammonia or nitric acid, constituting albumen, casein, or gluten. Thus, the plant derives its food almost entirely from the inorganic kingdom, while the animal, on the contrary, from its anatomical conformation, can only exist upon organic matter.

During the present century, such great discoveries have been made in the science of Organic Chemistry, particularly by the discoveries of the late Sir Humphry Davy, Dr. Edward Turner, Professor Brande, Drs. Faraday and Gregory, and last, though not the least, that of Baron Justus Liebig, of Giessen—to which may be added the labors of a rising young chemist, Dr. Lyon Playfair—that much valuable knowledge has been imparted to the philosophical and agricultural world, upon the physiology of animal life, and the manner by which the system is nourished and supported.

We now, therefore, can well comprehend why one species of diet is found to possess a greater quantity of nourishment than another—why the inhabitant of the frozen regions of the North, as I have seen in the persons of the Esquimaux and Greenlander, should require great quantities of train-oil with his daily food. And why? His stomach will digest the rancid flesh and blubber from their whales and seals, while the same species would not only be disgusting to us, but actually prove both physically and mentally injurious to the inhabitants of more congenial and warmer climates. We also understand from the same source how it is that we cannot feed animals or exist ourselves upon a diet wholly composed of sugar, starch, gum, or gelatine; and yet, although we cannot live upon any one of these substances, yet when they are all

properly combined, strange as it may appear to some, it is of all these materials, when properly united, that our daily food is composed. The great office of Chemistry, as applied to this department of human knowledge, is to point out the peculiar wants of animal bodies, and how these are duly supplied in the food we and they daily consume. Anatomy informs us that, like the vegetable, an animal body is composed of two portions: the organic particles form a considerable portion of the flesh or softer tissues of the body; and also an inorganic portion, which Professor Berzelius, of Stockholm, Guy Lussac, Vauquelin, Thenard, and Fourcroy, with Dr. Magendie, of Paris, and other experimental chemists, have demonstrated also to constitute a small portion of the softer parts; but it is in the bones, which constitute the skeleton, that they are principally found; and these are directly derived in the *herbivora* (or vegetable-feeding animals) from the vegetable diet upon which they subsist, while the *carnivora* (or flesh-eating tribes) obtain it indirectly from the blood and flesh of the herbivorous animals upon which they prey.

These remarks naturally lead us to a proper consideration of those substances which form chiefly the food of those animals which are bred, reared and supported by the former, either for agricultural labor or as food for man, and in many cases for both—strange to say, they are principally herbivorous in their nature. Examine chemically, therefore, any article which they consume—no matter whether it is wheat, beans, peas, cabbage, carrots or turnips—we shall soon find that, besides water, it has gum, sugar, starch, and a considerable quantity of woody fibre, in union with a small portion of a fatty matter; all these constituents, as I observed in my former Lectures, will be found to be composed only of three elements, viz oxygen, carbon and hydrogen, which exist combined in nearly the same proportions. But we likewise find that there are many other substances contained in vegetables which contain nitrogen, and this is in addition to those elements which compose starch, gum, &c., and are known to the chemist by the appellations of gluten, vegetable albumen, and casein. Now if we take a small quantity of fine wheaten flour, and mix it with water into a paste, and well wash it upon a sieve, by pouring a stream of cold water over it while it is kneaded with the hand, all the sugar, starch and gum will pass away through the sieve with the water, and the substance left behind will resemble bird-lime, being of an equally tenacious nature: this is, therefore, the gluten which the wheat contained; and when dried, the water it possessed being evaporated, it resembles horn, being a hard, brittle mass, and if burnt it emits a similar unpleasant effluvia to burnt horn, feathers, or other animal matter. The gluten which is obtained from peas, beans, or the fibrin and vegetable albumen procured from the expressed juices of the carrot, turnip or cabbage, all possess analogous properties to those found in wheat, with this exception, that they are all soluble in cold water, whereas the gluten which is obtained from wheat is not. If we submit these substances to the test of chemical analysis, we speedily discover them to be all composed of the same constituents, and also that they are likewise identically the same as those composing the flesh and blood of animals generally; but you must please to bear in mind that this remarkable identity does not consist in their containing azote or nitrogen in combination with oxygen, carbon and hydrogen, in the same or nearly the same proportions as in animal flesh and blood, but it extends to the existence of a small quantity of sulphur and phosphorus, which is found to be associated with the muscular flesh forming one of the soft tissues of the animal. Hence we may very properly assert, as a physiological axiom, that the blood and flesh are, by the Great Author of Nature, found actually ready prepared and elaborated in the vegetable. The plant it is which elaborates and duly prepares all the elements of water, carbonic acid, and ammonia, which constituent particles are found to be identically the same as the muscular animal flesh: consequently, the animal has nothing more to do than to apply them to his own use for the purposes of nutrition, secretion, and the vivification of life.

The following Table, adopted by my talented friend, Professor Gyde, of Painswick, will give the reader an idea of the actual identity of composition existing between these substances:

TABLE I.

Elements.	Gluten from Flour.	Casein from Peas.	Ox Blood.	Ox Flesh.
Oxygen,	22·4	23·0	22·2	22·3
Hydrogen	7·5	7·2	7·5	7·5
Carbon,	54·2	54·1	54·3	54·1
Nitrogen,	15·9	15·9	15·8	15·7

Every animal body momently undergoes some physiological change; every motion, thought and action is of course performed at the expense of some, and many of almost every part of the body; these incessant alterations and action cause the great demand for food, which Nature constantly requires to repair the waste that is continually taking place. You may speedily ascertain the truth of this fact, by noticing its illustration in those animals who have long been kept without food, or had but a scanty supply, or where it did not possess sufficient nutritious properties; and also in those animals who have undergone great exertion and bodily fatigue, when contrasted with those but little fatigued, and whose food was good in quality and sufficient in quantity. The fine horses formerly attached to our well-appointed coaches, before the construction of railroads and the employment of giant steam-power, and which vehicles will ere long only be remembered by being recorded in the pages of history among

the phenomena that have been and are passed away—the fine horses I have named were almost exclusively fed upon oats and beans, which are two of the most nutritious kinds of all species of vegetable food; while, on the other hand, those horses performing but a small amount of laborious work, will supply the natural waste of their bodies from the very small comparative quantity of gluten which is found to be contained in hay or clover, or both.

I have already informed you that the food of classes of animals consists of two kinds of distinct species of matter; viz. the one which possesses a great proportion of azote, or nitrogen, as one of its principal constituents, and which the Table I have referred to tells us is identical with the blood and muscular flesh of the animal: the other portion is destitute of nitrogen, but consists of gum, starch, sugar and woody fibre. Now, every one of these different materials answers two quite distinct but very important purposes in the economy of every animal body. The first, or the nitrogenous constituents, supply the waste which has occurred in the fluids and tissues of the body, and, as Dr. Magendie very properly states, may justly be termed the elements of nutrition; the last, which are the non-nitrogenous portion, act, if I may apply the expression, as fuel for combustion in the lungs, in order to keep up the due supply of animal heat, and under some peculiar circumstances also will contribute to the formation of fat.—These elements may likewise be arranged under two great heads, viz. those which are necessary to the function of nutrition, and those affecting that of respiration.

I respectfully call your attention to the following Table, wherein they are exemplified:

TABLE II.

1. Elements of Nutrition.	2. Elements of Respiration.
Gluten.	Gum.
Albumen.	Starch.
Casein.	Sugar.
Flesh, or Muscular Fibre.	Oil or Fat.
Blood.	Alcohol.

The elements of nutrition (No. 1) must of necessity exist in combination with every substance which experience has taught us to be capable of supplying food to the animal; but, ere it can impart the nutritious properties, numerous important mechanical and chemical changes must undergo, ere it can take place. The grand process of digestion must be performed—by which I mean, the manner by which the nutritient particles may be rendered soluble, and not only capable of entering, but even of forming new blood. A brief detail of the manner in which this is performed may not be uninteresting to some of my present auditory. It is accomplished in the following manner: The food, when received into the mouth, is broken down by the teeth, where it becomes mixed with the saliva, which is secreted by the glands that are situated near the angle of the jaw, and beneath the tongue; when the process of mastication is completed, the morsel is collected into a ball at the base of the tongue, and by the act of deglutition or swallowing it is carried past the pharynx into the œsophagus or gullet, down which it passes into the stomach, where it enters at the cardiac orifice; it remains there for a short time, according to the nature both of the animal and the food it has partaken of, (in man it is supposed to be about two hours.) The chemical and mechanical action that now takes place is technically called, in physiological language, the process of *chymification;* when this is perfected, the orifice at the opposite extremity (denominated the pylorus) becomes dilated, and the chyme passes into the first of the small intestines, anatomically named the *duodenum*, where it becomes mixed with the bile from the liver, and the fluid from the *pancreas* or sweat-bread This being accomplished, the process of *chylification* now commences—a series of small, minute vessels, named lacteals, whose mouths open on the mucous (or villous) coat of the bowel or intestine, which absorbs the nutritious portion of the food, (which resembles milk in appearance, hence it is named *chyle.*) This fluid, being conducted by numerous branches, passes into one great reservoir, called the *thoracic duct*, which ends in a large vein near the heart (the left subclavian), and there it is mixed with the blood; but being loaded with carbon, which is inimical to the due preservation of animal life, the blood passes from the heart to the lungs, where it becomes oxygenized, and fit for all the purposes of the animal economy. The non-nutritious portion, from which the chyle has been extracted, passes through the last of the small intestines *(the jejunum)* into the whole course of the larger part of the alimentary canal—viz. the *cæcum*, *colon* and *rectum*, and from the last they are finally ejected from the body—ultimately again to reënter it in another form, in consequence of its forming manure, and therefore affording food for plants in the manner detailed in my former Lectures.

But independent of the simple fact that the salivary fluid, when commixed with the food, renders the digestion of the aliment far more easy, yet Baron Liebig imagines that it possesses the peculiar offices of inclosing and combining air, in the form of froth; the oxygen which it contains enters into union with the constituents of the food, while the nitrogen is again evolved through the medium of the lungs and skin; this philosopher is likewise of opinion that, in many of the herbivorous quadrupeds, their rumination (as the oxen and sheep, for example) has for one of its principal objects a complete renewal with the repeated introduction of pure oxygen into the animal's stomach; and that, unless this takes place, the function of rumination cannot be duly perfected in the stomach. I have given you a brief outline of the manner in which digestion is accomplished, but in doing so I omitted to observe that attached to the mu-

cous or villous coat of the stomach are a series of minute glands, which secrete what is denominated the *gastric juice* or *fluid*, and which, among other matters, contains a quantity of pure *mucus*, in combination with a small quantity of *free hydrochloric* or *muriatic acid* (called in common language *spirits of salts*), with a peculiar principle known to chemists under the appellation of *pepsin*, and which has been affirmed by Dr. Sylvester, of Clapham, to be in itself a most active and virulent poison, but whose noxious properties are chemically neutralized in the stomach and intestines during the function of digestion.

I have stated that *hydrochloric acid* is always present in the stomach, and particularly so during the digestive process: for the discovery of this curious but important chemical fact, we are indebted equally to M. Tiedmann Gmelin (of Germany) and Dr. Prout, of London. This acid may be artificially obtained by the decomposition of chloride of sodium, or *common table salt* (which is only a combination of pure muriatic acid and soda); the acid is of great service in promoting the function of digestion in the stomach, while the soda, as an alkali, copiously enters into the formation of bile. Thus it is that a certain proportion of salt is necessary to digestion in every species of animals, at least as far as our knowledge extends in the classes of quadrupeds and birds; and, although Chemistry tells us that it is an essential ingredient in the burnt ashes of all vegetables, yet we very rarely find it existing in a sufficient quantity to form a regular supply of either the acid or soda which is required for the due performance of the function of healthy digestion; and, therefore, not only should we ourselves partake of a certain quantity daily with our own food, but should place some within the reach of both birds and cattle under our management in the farms we are connected with. Nature is the philosopher's best monitor, and the scientific farmer cannot do better than obey her axioms. We find that all classes of animals have, if I may use the expression, an instinctive love for salt, and seek for it as for a portion of their diurnal food. It is well known that the pigeon tribe of birds, if they cannot obtain it elsewhere, will even have recourse to the mortar which cements the bricks of houses together; they have been frequently known to fly to the sea-coast in order to procure it; and pigeon-fanciers who are not so honest as to mind *borrowing* their neighbors' birds, will allure them by means of what is known as a *salt cake*, placed in or near the dove-cote, wherein muriate of soda forms an essential ingredient; this nefarious practice is now forbidden, very properly, by an act of Parliament, which awards a punishment of seven years' transportation upon conviction; it however confirms the important physiological fact I have just noticed.

In the ruminating tribe of the class *Mammalia*, as the ox and the sheep, the important process of digestion differs but little from that which I have stated, and whose stomachs are of the simplest construction, being little else than a mere membraneous bag; but in the *Ruminantia*, we find their stomachs considerably more complicated, in order that they may be enabled to extract the due proportion of nourishment which they require from the food which they eat; as in the case of grass, by way of example, which we find by chemical investigation contains but very little nourishment in proportion to the bulk. Let us now philosophize for a moment, and see the manner in which the ox and those of his class perform the functions of mastication and digestion. In these creatures, the grass is cropped from the surface of the earth by means of the fore-teeth, and after being but very slightly masticated, is swallowed; this process continues until the first stomach is filled,* when the animal lies down apparently well and perfectly contented; but it is now that the curious process of rumination commences. In the first stomach, the food is mixed with a secreted fluid not dissimilar to the saliva, and in a kind of semi-pulpy mass it is returned into the mouth, in small detached portions, where perfect mastication takes place, and during this process the animal is in a recumbent position; after the second and perfect mastication is completed, the food passes into the second stomach, denominated by comparative anatomists *omasum;* from this it passes into the third stomach, the *abomasum;* in these last two, it undergoes very important changes, and whence it passes into the fourth or really true stomach. It is in this last portion of the curious but complicated species of apparatus, that the function of digestion is ultimately and perfectly performed; and the last processes of extracting the nutriment from the food are exactly similar to that which I have described as occurring in man and those animals having simple membraneous stomachs. The vital fluid of all animals is commonly denominated the blood, in which, as Holy Writ truly observes, "*is life;*" this fluid is either formed from vegetables, as in the *Herbivora*, or from flesh, as in the *Carnivora;* yet in both tribes of animals the composition and essential constituents are the same, both in their physical effects upon the system, and as portrayed by chemical analysis. We find it circulating throughout not only the principal organs in the living animal, but by means of vessels as fine as the human hair: so extremely delicate are they that they will not admit the thicker coloring particles of the blood itself; yet the properties which the blood possesses are most surprising; it replenishes the fluids and solids which are diminished by the waste, wear and tear of the body; it places osseous or bony matter in the skeleton for its growth and support;

* We should here observe that the Lecturer exhibited drawings of the stomach, as found in both tribes of animals.

forms fleshy fibres for soft muscular tissue, by which the motions of the body are performed; and from the blood are all the different bodily secretions which are necessary for the healthy existence of the animal secreted and performed; the blood supplies carbon to the lungs for keeping up the animal heat, with fat and oily fluids deposited in the softer tissues as well as in the very substances of the bones themselves, as a store from which Nature can extract a due supply when necessity compels her; lastly, the blood is the true moving power by which the whole animal machine is put into motion, just as steam is to the steam-engine, and coals as fuel to the fire.

As far as I have proceeded I have only spoken of that part of the food from which animal flesh is naturally formed; *i. e.*, the gluten extracted from the vegetable, the albumen, and the casein: my self-imposed task, however, is not yet complete. I have now to take into consideration the offices which are fulfilled by the sugar, starch, gum, oil or fat, which we find, by examination, constitute so large a proportion of the food of man, and the principal of the lower orders of animals. Now, we find from observation, that every animal has a temperature above that of the surrounding atmosphere; and physiologists have denominated it the animal heat, which, in those animals domesticated by man, are found to be, on an average, about 100° of Fahrenheit's thermometer—in man it is about 97°, and we find that it continues much the same under every kind of circumstance, whether we live beneath a tropical sun, a more temperate region, or the frozen climes of the North.

The animal heat originates in the body; it is created by the chemical combination, or, if I may employ the term, the combustion of the elements which enter into the formation of starch, with the other non-nitrogenous constituent particles of the food, united with the oxygen of the air, which is received into the lungs during the function of inspiration; and likewise by a portion that is absorbed through the skin.

Upon examining the atmospheric air which we breathe, we find, upon submitting it to a chemical analysis, that it is composed of twenty-one parts of oxygen and seventy-nine parts of nitrogen, with so small a quantity of carbonic acid gas that its amount cannot be calculated in a given quantity of air; yet of course an immense proportion must exist, for it is supposed that the atmosphere extends forty-five miles at least in hight, and presses at the ratio of 15 lbs. upon every square inch: this was discovered by Torricelli and Galileo in the 17th century. However, when the air we have inspired has been expelled from the body, we find that it has undergone but little if any change; the oxygen, however, has disappeared, and been replaced by an equable quantity of carbonic acid gas, with a small quantity of aqueous vapor: the proportion of animal heat which attends this chemical change, is consequent upon the amount of carbon and hydrogen which is consumed. The heat which is thus produced is occasioned by exactly the same chemical action as that which causes the combustion of wood in a stove, or the fat of a lamp or candle, and the products of which are exactly the same: the carbon and the hydrogen of the food combine with the oxygen that is supplied by the atmosphere, and heat is generated in the body in proportion to the quantity which is consumed. In the stove or lamp the same changes take place, the fuel being composed of similar elements entering into the composition of the food; and the results of the combustion are precisely the same, the combination being less energetic in the body than in the stove or lamp.

Now, how is it in man? In a full-grown adult, if we take the weight of the carbon which is disengaged in the excretions, from the weight of the carbon contained in the food that is consumed during the twenty-four hours, we shall soon find that the remainder will amount to somewhere about fourteen ounces, and this is assimilated with the component parts of the body; the weight of which, however, does not increase, for it is a well known philosophical axiom, that fourteen ounces of carbon will require thirty-seven ounces of oxygen* for its transformation into carbonic acid, which passes off from the lungs and skin. Thus, in this simple manner, we can easily comprehend how it is that the enormous quantity of oxygen which is introduced into the animal body by the progress of inspiration, and the great proportion of carbon which is derived from the food consumed, are removed from the body; and likewise, how it is that the food required for supporting the animal in its normal condition is in exact proportion to the quantity of oxygen that is absorbed. Now, we find that a horse consumes daily, in his food, upon an average, eighty-nine ounces of pure carbon, and a cow seventy ounces; the former requires 212½ ounces, the latter 186½ ounces of oxygen, in order to transform the consumed carbon into carbonic acid. I have already stated that, in addition to the constituents which I have named, the vegetable is found upon chemical analysis to contain a small quantity of fatty matter in addition to the earthy and saline substances of which it is composed. The question is now to be answered, What are the purposes which they answer in the animal economy? Every animal that is in a state of sound health has a layer of fat, which is situated between the skin and the muscles, and likewise between the muscles themselves, by which means they have great freedom of motion. Fat is also deposited in the body of the animal, particularly in the neighborhood of the bowels, also attached to a portion of them, and enveloping the kidneys, (where it

* One ounce of oxygen equals 1416·5 cubic inches.

is vulgarly called by butchers the suet). In the *Carnivora* or flesh-eating animals, the fat which is contained in the food they eat, is consumed in the lungs for the purpose of preserving the proper quantity of animal heat, and consequently, in these creatures, we but very rarely find the body of the carnivorous animal to contain much fat. M. Darwin, in his Journal of Researches into the Natural History of the Countries visited during the voyage of the Beagle, informs us that the Gauchos, or simple countrymen in the Pampas, South America, lived for months together upon flesh, but he observed that they ate large quantities of fat; and Dr. Richardson, in speaking of these people, has also remarked "that, when they have fed for a long time solely upon lean animal food, the desire for fat becomes so insatiable that they can consume a large quantity of unmixed and even oily fat, without nausea." This instinctive desire for fat in man and animals living on flesh arises from the imperative demands which are daily made upon the body for carbon to keep up the proper amount of animal heat, and which is contained in the fat that is consumed as an article of diet.

Thus far in the omnivorous and carnivorous animals; but in the herbivorous creatures it is widely different. The supply to the lungs is derived from the starch, sugar and gum in the vegetable, while the fat which exists in the food is in a great measure laid up as fat in the animal body; therefore it is that we find the bodies of the herbivorous quadrupeds generally much fatter than the *Carnivora*. But if the supply of the starch in the food is inadequate to the demands of respiration, then the elements of the fat become consumed in the lungs, exactly as it is in the carnivorous animal; the sugar, gum, and starch become speedily transformed into aqueous vapor and carbonic acid in the animal system: these are the first consumed; and, if this supply proves to be inadequate for the purpose required, then the fat, next the fat of the animal body, and finally the tissues themselves, are placed under contribution, the animal becoming thin, feeble, and emaciated, and ultimately dying from starvation.

['The (London) Plow.'

CARROTS *versus* OATS.—We have had twenty communications from various sources, all of which concur in saying that a peck of carrots will, with the same quantity of hay, keep working-horses in as good condition, and many say better, than a peck of oats and a like quantity of hay; or that a peck of carrots and a peck of oats are equal to half a bushel of oats. 60 bushels of oats and 900 of carrots per acre are large crops.

Say to raise carrots you plow your land once oftener than for oats, at a high allowance for man and team		$2 50
Say it takes 12 days' labor to hoe the acre three times, and 4 days' labor to dry the crop—16 days at 75 cents per day		12 00
Say additional manure for carrots, which, however, leaves the land the richer		10 50
Total		$25 00
Say, then, you raise only 500 bushels of carrots per acre, at 35 cents per bushel	$175	
Deduct extra cost of cultivation	25	
Produce of one acre of carrots		$150 00
Say you raise 40 bushels of oats per acre, place the seed of the two as equal, and that the straw of the oats pays for reaping and threshing, and you have 35 cents per bushel		14 00
		$136 00

clear gain, if you feed your carrots to your horses or cows.

Then strike off half again, and reduce your crop of carrots to 250 bushels, and still you have $68 against $14.

COURSE OF LECTURES ON BOTANY IN REFERENCE TO AGRICULTURE.

By Charles Johnson, Esq., *Professor of Botany at Guy's Hospital, &c. &c. At Messrs. Nesbit's Agricultural and Scientific Training School, Kennington Lane, Lambeth, near London.*

INTRODUCTORY LECTURE.

We commence this day a series of Lectures on Botany, not as an abstract science, but as one intimately connected with various branches of human economy, and more especially with that which, as it ever has been, so it must continue to be, of the utmost importance to mankind, viz., *the cultivation of the earth, the prime source of our civilization and of almost every art that ministers to the elevation and improvement of Society.* Itself an art of the highest antiquity, Agriculture must al-

ways have been one of progression; more or less simple in its practice at the first, observation and experience season after season suggesting new plans of operation, new means of improving or maintaining the fertility of the soil, and of guarding against those casualties that in every country and climate affect the productiveness of the crop. The success —sometimes, perhaps, rather fancied than real—of one experiment led to the institution of others, and thus the pursuits of the husbandman, originally followed without rule, and precarious in their results, were by degrees brought to a state of perfection and fixity of purpose that elevated the art to the science, the mere laborer to the philosopher. Such has been its progress in all ages among all nations. But to advance beyond a certain point, the cultivator of the earth must extend his sphere of information, must seek the aid of other sciences, possibly of those which, from imperfect acquaintance with their objects, he has hitherto regarded as completely isolated from his own. So mutually dependent are the laws and operations of Nature upon each other, such her unity of action, that to confine ourselves to any branch of knowledge abstractedly is folly, willful blindness: learn all you can, and you will not keep it seven years without turning it to some useful purpose. We are advancing in our estimation of these things daily; and you whom I now address will stride, I trust, not one, but many steps, beyond your fathers in the great work of improvement, whatever may be the duties of your after life. A high-class farmer of the past generation would have ridiculed the idea of his son and intended successor being taught at school the rudiments of chemistry and natural philosophy: they might, indeed, be very useful to a manufacturer, but quite superfluous in his case. As to Botany, he would regard it as downright nonsense. Not thirty years back, I knew a gentleman, residing in one of the best cultivated districts in England, who had the reputation among his poorer neighbors and dependents of dabbling in magic, and among those of his own grade, even the best informed, was looked upon with a sort of pity as a monomaniac—simply because, being a man of some scientific acquirements, he was laboring by rational means to enhance the value of his own property, and suggest improvements to those around him; had written a book on the natural history of his native county, employed his leisure from other pursuits in analyzing, in a small, well-furnished laboratory, the subsoil of his own and his neighbors' fields; occasionally cultivated patches of all sorts of weeds, exotic and British grasses, &c., with a view to the best means of exterminating the former and ascertaining the value of the latter, in a plot of ground set apart for the purpose; and, more wonderful than all, sought to discourage poaching by turning away his gamekeeper and neglecting his preserves. The prejudices against new methods of cultivation are now quickly subsiding, in proportion to the diffusion of general knowledge; the numerous Agricultural and Horticultural Societies that have successively started into existence in this country, the increasing numbers of their members, and interesting character of their meetings, all evince that a spirit of inquiry is extending its influence among our rural population, no less than among our manufacturers and merchants, the results of which it is at present difficult to speculate upon, but the general cry is, "Forward, forward." In Great Britain every movement of the kind has been hitherto due to the energy of private individuals and the ready response of an industrious and enterprising people; but on the Continent—in France, Prussia, and most of the German States—public schools, under the auspices of the Governments, and established by them, are open for the education of youth in this important department of human economy, furnished with professors in the auxiliary branches of science, as chemistry, botany, geology, &c., and with all the essentials requisite for combining theory with practice. The advantages already derived to the States in question from these establishments have been sufficient to prove the value of the extended system of education they have afforded; and old prejudices are universally disappearing as their pupils become distributed through the Provinces, carrying with them the most unbiased views and openness to conviction which are the natural results of a liberal course of instruction.

The value of Botany, as a practical science, is not so well appreciated in this country as it is abroad; and this simply because the attention of our practical men has not been hitherto sufficiently directed to it, nay, has even been averted in consequence of the very general prejudice that it is better fitted for a plaything than a tool; a notion—I will not call it an opinion—that originated very naturally, from the superficial manner in which its study was followed in this country by most of those who aspired to rank among its votaries, even so recently as twenty years ago. It was then little more than the art of distinguishing one plant from another, of allotting to each its learned name and place in an arbitrary system of arrangement, and, sometimes, of adding to these capabilities a remembrance of the qualities of those used as food or medicine. Now, to use the words of a modern writer, one of its most able and industrious professors, "it comprehends a knowledge not only of the names and uses of plants, but of their external and internal organization, and of their anatomy and physiological phenomena; it embraces a consideration of the plan upon which those multitudes of vegetable forms that clothe the earth have been created, of the skillful combinations out of which so many various organs have emanated, of the laws that regulate the dispersion and location of species, and of the influ-

ence that climate exercises upon their development; and, lastly, from botany, as now understood in its most extensive signification, is inseparable the knowledge of the various ways in which the laws of vegetable life are applicable to the augmentation of the luxuries and comforts, or to the diminution of the wants and miseries of mankind. It is by no means, as some suppose, a science for the idle philosopher in his closet; neither is it merely an amusing accomplishment, as others appear to think; on the contrary, its field is in the midst of meadows, and gardens, and forests, on the sides of mountains, and in the depths of mines; wherever vegetation still flourishes, or wherever it attests, by its remains, the existence of a former world. It is the science that converts the useless or the noxious weed into the nutritious vegetable; which changes a barren, volcanic rock like Ascension, into a green and fertile island; and which enables the man of science, by the power it gives him of judging how far the productions of one climate are susceptible of cultivation in another, to guide the colonist in his enterprises, and to save him from those errors and losses into which all such persons unacquainted with botany are liable to fall. This science, finally, is that which teaches the physician how to discover in every region the medicines that are best adapted for the maladies that prevail in it; and which, by furnishing him with a certain clue to the knowledge of the tribes in which particular properties are or are not to be found, renders him as much at ease, alone and seemingly without resources, in a land of unknown herbs, as if he were in the midst of a magazine of drugs in some civilized country."

This department of science, which is now becoming a subject of general interest, in consequence of the new views of the economy of Nature in her development of organic being, that have been obtained by a deeper insight into vegetable anatomy and physiology, cannot but be more especially valuable to those whose pursuits are so intimately connected with the objects of its study, the cultivators of the soil. There may be, doubtless there are still, many such as those of which we have previously spoken as existing thirty years ago, who in the pride of their ignorance, may laugh at and despise the lessons of the theorist as opposed to old practices, the result of the experience that has been handed down from their forefathers; until wakened to slow conviction of their importance by the success of their more enterprising neighbors, and then deplore the time they have lost, and which others have occupied in the steady progress to improvement. The views of the merely scientific man may often, it is true, be only speculative; they may sometimes be in direct opposition to facts, of which he has himself no direct means of becoming acquainted. But who is to test the value of his experiments, unless the man of practice? He alone, in his broader field of inquiry, is competent to detect in their action the errors in minutiæ that have escaped the notice of the chemist in his laboratory, and the naturalist in his closet; he chiefly is to derive the benefits accruing from their united labors; and a knowledge of the leading principles of their science and of natural philosophy in the aggregate will materially assist, nay, is absolutely necessary to qualify him for both the trial and the benefit. It is surprising that the very evident advantages to cultivation that an acquaintance with the structure and vital function of vegetables promises, should have hitherto been so little estimated by the agriculturist: the practical gardener has far anticipated him in the pursuit of inquiries equally essential to them both; although, perhaps, himself in the main, still very distant from acquaintance with a vast body of facts that might be rendered available by his skill. How much, for instance, has a knowledge of the organs and attributes of the flower contributed to the advancement of his art? Let us look at a flower: it is really a complicated object; much more so than many who have long admired and cherished it for its beauty and fragrance have any idea of; or, if they have, have not thought worthy of examination. Its greatest beauty consists not in the gorgeous color, nor its value in the most exquisite odor, but in the admirable adaptation of its parts, and their subservience to the reproduction of its kind.

Take any common flower of the field or garden, only observing that, if one of the latter locality, it is not of the kind called "double," which, however admirable as garden ornaments—and not altogether to be despised by the botanist, on account of the illustrations they afford him of the morbid development of parts to which the individuals of the vegetable kingdom are liable under peculiar circumstances—are not at all calculated to display the unity of design that constitutes the chief object of interest in a perfect flower. Externally, investing the base of the flower, is a series of small leaves, usually of a green color, and from three to five in number, separate, and spreading, as in the buttercup and the peony, or conducted into the form of a cup or vase, as in the primrose or pink: this is the *calyx*, or flower-cup; it covers the rest of the flower in the state of bud, and serves to support and hold together the more delicate internal organs when expanded. Within the calyx is the *corolla* or blossom, composed of leaves, generally of the same number as those of the calyx, which are either white or variously colored, and called *petals;* these are either distinct, as in the rose and the wall-flower, or connected, as in the fox-glove and potato-flower. Within the corolla are the *stamens*, generally thread or wire-like processes, with yellow, or, occasionally, purplish or reddish tips; these are very variable in their size, length and number, in the flowers of different plants; some flowers have only one or two stamens—in the

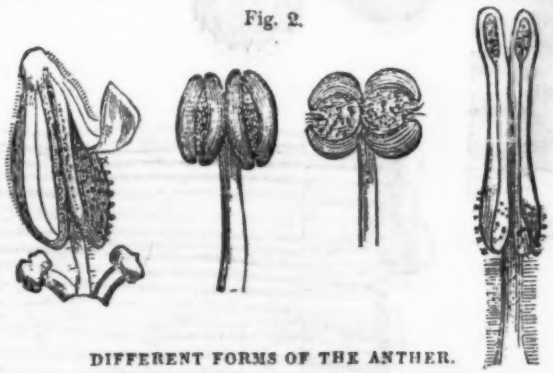
bell-flower there are five, in the tulip six—and in some others they are too numerous to be counted. The stamens surround the *pistil*—so called from the Latin word *pistillum*, a *little pillar* or *column*, or, by a more homely interpretation, a *pestle*: look at the pistil in the flower of the lily; at the lower extremity, where attached to the flower, is a thickish, green body, called the *germen*, or *ovary*, from containing the rudiments of the seeds; the long, wire-like part in which this terminates is called the ***style***, and the knob at the extremity of the style is named the ***stigma***. Look at the pistil of the tulip; in that the germen is long and three-sided, bearing the curiously three-parted stigma on its summit, and the style is wanting. The pistil is not always solitary; in many flowers there are two, three, or more together; and they are frequently very numerous, as in the common buttercup, where the many little green, pointed grains in the center of the flower are so many pistils. See fig. 1: *a* the calyx; *b* the corolla; *c* the stamens; *d* the pistils.

Fig. 1.

STRUCTURE OF FLOWERS.

In most of the higher orders of plants, all of these parts are present in the perfect flower; and sometimes other appendages, of which we may speak hereafter; but in some there is no corolla, in others neither corolla nor calyx, and in many the stamens and pistils occupy distinct flowers—all very important characters in distinguishing one family of plants from another, and especially deserving of the attention of the cultivator.

Fig. 2.



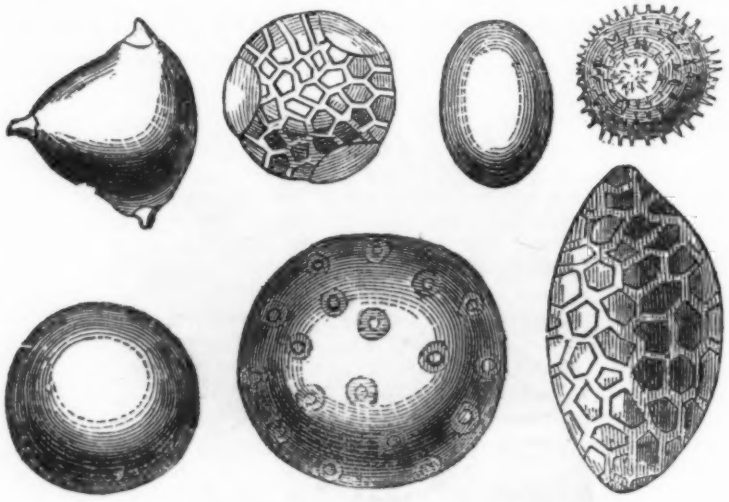
DIFFERENT FORMS OF THE ANTHER.

Of all the parts or organs of the flower, the stamens and pistils are the most essential. The stamen is a very curious body; the lower part, called the *filament*, from its resemblance when very slender to a thread of hair, is frequently absent, the colored tip being attached to the corolla or some other part of the flower; this tip, denominated the ***anther***, is a little

case or box, usually double, opening at a certain period on each side, and scattering an exceedingly fine powder, called the *pollen*. The forms of the anther are various, and likewise the modes of opening. (See figure 2.) Thus sometimes, and indeed most frequently, the opening is by a longitudinal slit the whole length of the anther; in many instances it is a small pore or perforation at the extremity, and in others it takes place by a little door or valve turning upward, as shown in our figures.

The grains of pollen are very beautiful objects for the microscope, under which they present a great diversity in size, form, and structure. (See fig. 3.)

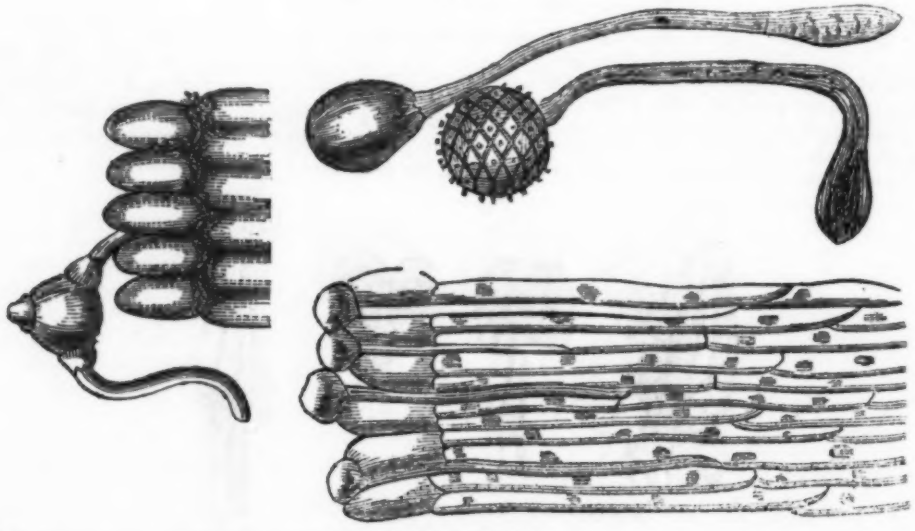
Fig. 3.



GRAINS OF POLLEN MAGNIFIED.

The pollen is an agent of vast importance in the economy of the vegetable kingdom; the maturity of fruit and the production of seed being dependent upon the contact of these minute bodies with the stigma or summit of the pistil. About the period at which the anthers burst and scatter the pollen, the surface of the stigma is seen to be moistened by a viscid secretion, that, occasioning the adherence of such grains as light upon it at the moment of dispersion, so acts likewise upon them as to stimulate the ejection of one or more slender tubes from the surface of each individually; which tubes extending more or less according to the length of the pistil penetrate through its tissue until they reach the interior of the germen and come in contact with the embryon seeds. In the event

Fig. 4.



POLLEN TUBES.

of this contact not taking place, the seed becomes abortive; and hence in many seed-cases, as those in the common pea, we find only two or three perfect seeds, instead of nine or ten, perhaps, whose rudiments were present. The grains of pollen, examined by

a very high magnifying power, are found to consist of a membrane, inclosing a fluid, in which an infinite number of excessively minute particles are seen in active motion; these contents are eventually discharged through the tube, the grain being left empty. The figures in the 4th wood-cut are intended to illustrate this action of the pollen tubes; of the two larger ones, that with the triangular pollen represents it as taking place on the stigma of the common evening primrose; the other, the descent of the tubes through the stigma and parts of the style of the great snapdragon or calve's snout. This curious process was unknown to naturalists until recently, though the influence of the pollen in the fertilization of the seed seems to have been understood in relation to certain plants from a period of great antiquity, especially some of those in which the stamens and pistils are produced in different flowers, and occasionally on different individuals, whose male and female attributes must have been recognized by the cultivator before success could have attended his labors. As a striking instance, we may refer to the date, the staple food of the nations of the Arab stock from time immemorial. The date tree is a kind of palm growing abundantly in the sandy and rocky districts of Persia, the adjoining Provinces of Western Asia, Arabia, Egypt, and Northern Africa, and is largely and assiduously cultivated by the inhabitants. A forest of dates is a magazine of provision for a city, and the failure of a crop spreads depopulation through whole provinces; the quantity of fruit yielded by a single tree in each season is, on the average, from two to three hundred weight; every village has its plantation, and even the splendid city of Zenobia derived its Roman name of "Palmyra," and its Arabic and scriptural appellation of "Tamor" or "Tadmor" in the desert, from the groves of dates by which it was from necessity surrounded. These plantations are, of course, chiefly of the trees with pistil or fruit-bearing flowers; but in order to insure a crop, the natives are accustomed to gather the large bunches of flowers from the male dates, about the time at which the stamens are ready to scatter their pollen, and suspend them over the others; nay, to guard against an adverse season, they lay by stores of pollen from year to year. This "marriage of the palms," as it is called in the figurative language of the East, is a festival of too early origin to be recorded even by tradition. So well is the necessity of the process understood even by the wildest of the wandering and predatory tribes, that in carrying war into the lands of their neighbors, they frequently cut down the stem-bearing dates as the most dreadful vengeance they can inflict. Some idea of the importance of the act may be gathered from the statement of Kæmpfer, that the threat only of so doing once put a stop to an intended invasion of a then very formidable power: he mentions, "I remember it happened in my time that the Grand Signior meditated an invasion of the city and territory of Bassora, which the prince of that country prevented by giving out that he would destroy all the male palm trees on the first approach of the enemy, and by that means cut off from them all supplies of food during the siege."

This principle in cultivation, so long understood and made available in that of the date, was afterward found to be applicable in the nurture of all kinds of flowering plants. Of the experiments by which it became established beyond the reach of controversy, or of the means by which our present knowledge of the important fact has been acquired, it is unnecessary for us now to inquire; however interesting the detail, we must wave it for the consideration of the result, viz., the vast power that knowledge has placed in the hands of civilized man, to multiply and enlarge these sources of food and luxury which he derives from the vegetable kingdom, and to which the plasticity of nature seems scarcely to have assigned a limit. The almost endless varieties exhibited among our cultivated plants, whether in root, or leaf, or flower, or fruit, or seed, have all their origin in the reciprocal action of the stamen and pistils; Nature herself has contributed many, but man has far outstridden her slow progress. The bee in passing from flower to flower, carries away stores of pollen destined to form the waxen fabric of his dwelling, and deposits stray particles adhering to his wings and body upon the pistils of others of a different kind; while numerous small flies and beetles are occupied, in their search for food, in impregnating in a similar manner the seeds of one plant with the pollen belonging to another. Hence the uncertainty attending the preservation of cherished varieties of annual plants in cultivation. When the gourd known by the name of "vegetable marrow," was first introduced into this country, I received some seeds of a very fine variety brought from the Continent, and celebrated there for the large size and luscious character of the white fruit; for several years no deterioration was observable; but having sown one season some of the seeds belonging to one large "marrow" fruit reserved for the purpose, my surprise was great to find, when the plants came into bearing, no fewer than three different varieties of gourds were the produce of different individuals, all of them totally unlike the original. This apparent anomaly was afterward explained away by the fact that, while my vegetable marrow was flourishing on one side of a high wall, my neighbor had trained a pumpkin and an orange gourd on the opposite; and the reserved fruit must have had its seeds fertilized by the pollen of both of them, and of some other species or variety brought by the bees or other insects from a greater distance. These freaks—if we may so term them—of Nature are not only productive of occasional loss and disappointment to the cultivator. but even of much greater evil, as

evinced by a circumstance recorded by Ray to have taken place a short time previous to the promulgation of the discoveries of Sir Thomas Millington respecting the functions of the flower. It appears that a market-gardener of Brentford, named Richard Baal, sold a quantity of the seed of the cauliflowers at that period bearing a very high price, to a number of persons carrying on the same trade in the vicinity of the metropolis, who, having sown it in the usual way, were surprised and alarmed on finding that, instead of cauliflowers, it produced a kind or variety of cabbage then in common use, and known as the long-leaved, probably resembling some of the coleworts or kales of the present day. Enraged at their loss, and attributing it to dishonesty on the part of Baal, they joined in a prosecution against him. The trial took place in Westminster Hall, where he was adjudged to be guilty of fraud, and sentenced not only to pay back the price of the seed, but to compensate the gardeners for their loss in cultivation, and the diminished value of their expected crop. Thus was poor Baal ruined both in fortune and character by the ignorance of his judges, who, had they been acquainted with the true state of the case, would in all probability have acquitted him of all fraudulent intention, attributing the mishap to the accidental impregnation of the pistils of the cauliflower by the pollen of the colewort, through the medium of insects, or wafted by the wind.

To attempt a detail of the advances made in Horticulture and Agriculture, particularly in the former, since the time of Baal, solely in consequence of our knowledge of a fact that, unknown, caused his ruin, would be an all but interminable task. The natural varieties of esculent and ornamental plants were then comparatively few: those artificially obtained since are now approaching to a number the extent of which it is impossible to foresee or calculate; their name is already "Legion." The most astonishing examples are to be found in the annals of the florists, the cultivator of geraniums, roses, heaths, and pansies. The art which has successively produced their hundreds and their thousands, differing only in the form or arrangement of a petal or the disposal of its tints, a spot or line may perhaps be regarded with contempt by those whose pursuits are directed to an end more immediately and obviously useful; but, without seeking to oppose their prejudices by tracing the necessary association between the elegant and the useful in elevating man in the scale of being, let me remind such persons that the plastic power of Nature is equally efficient in enlarging a root and seed as it is in varying the colors of a flower, and that the same means differently directed will effect both. How else the vast diversity of our home-grown fruits, almost equaling in many kinds, and in some surpassing those of our garden-flowers? The varieties of the apple alone—the most valuable of them all—amount to about two thousand; yet all of them are derived from two original species, viz., the *malus acerba*, the harsh and sour crab-tree of our forests, and the *malus mitis*, or sweet apple of a milder climate; both of which are by some botanists considered to be natural varieties of the same, though their origin cannot now be traced. These two thousand varieties, about one thousand kinds of pear, and half of the latter number of cherries and plums individually, have all originated from seed, and are indebted for their peculiarities in flavor, hue, and form or size, to the pollen with which that seed was fecundated. That which has been effected with regard to fruit and flowers is equally possible with roots and grain, as well as other vegetable products requiring cultivation on a large scale. If by crossing the breed in cattle the agility and muscular forces of the horse have been improved, adapting him to the various purposes for which his powers are required, the flesh of the ox and sheep rendered more palatable and nutritious, and the wool of the latter increased in fineness and quantity, the attributes of the plant may be called forth and rendered more subservient to the wealth of the agriculturist by similar means. The plant and the animal are both organic structures, subject to the same general laws of development and reproduction, of improvement and deterioration; and in permitting the manifestation of those laws, though only to the slight extent of our present knowledge, Nature has bestowed on man a power of forestalling, for his own immediate purposes, changes that, under her own dominion, would perhaps never take place, or but after the lapse of thousands of years.

We might pursue this subject much farther, but it would carry us beyond the ordinary limits of a lecture; and as my purpose in this, the introductory one of a course of some extent, is rather to call your attention to the science of Botany as one of practical utility, than as a mere source of amusement, if that purpose has been attained it will be sufficient for the present. In our next, some detail of the functions and organs by which vegetable life is maintained will be necessary to the understanding of those that will follow. The cultivator of plants who knows nothing of their anatomy and physiology is much in the same position as the quack who undertakes to lop off a man's limb without knowing the veins and arteries he must sever in the operation, or who prescribes a course of diet or medicine, ignorant alike of the nature of either, and of the vital energies through which he expects them to prevail. [London Farmer's Magazine

CARCASS WEIGHT OF SHEEP.

From the nature of the covering of sheep, it is only when these creatures are recently shorn of their fleece, that dimensions for ascertaining their carcass weight can be taken with accuracy; and, in so small an animal as the sheep, any inaccuracy in measurement would lead to much too great a proportional discrepancy to the true carcass weight to be of practical utility. The following observations will therefore be confined to the proportion of carcass to the weight of the animal alive.

The proportion of mutton to the live weight of sheep is somewhat, but not greatly, different to that of the carcass weight to the live weight of neat cattle. The specific gravity of mutton is less than that of beef: so far the proportion of the carcass to the live weight of sheep will be less than the proportion of the carcass to the live weight of oxen; but, when sheep are in a fat state, the thickness of their flesh, in proportion to their size, is greater than that of oxen, the difference being fully equal to compensate the less density of mutton. The offal of sheep is lighter in proportion to their live weight than that of oxen, excepting when sheep are in wool, at which time their skins proportionally exceed the hides of beasts. So that, when the greater thickness of flesh and small general offal is set off against the less density of mutton and the fleece, the analogy found to exist between the proportion of mutton to the live weight of sheep, and that of beef to the live weight of oxen, is not surprising.

From the experiments I have made, I do not find that so much depends upon *breed* in causing a variation in the proportion of mutton to the live weight of sheep, as I have found to be the case with respect of beef to the live weight of cattle. In sheep, when newly clipped, I have found a very close uniformity in the proportion of mutton to live weight of different breeds in equal condition, so much so that I have reason to believe that the only difference from breed arises from the greater or less fleece of wool peculiar to any particular kind of sheep; at any rate, the difference from breed, independent of the difference of the weight of fleece, is too insignificant to require classification as in the case of oxen. The breeds of sheep on which I have had most opportunities of making observations are the Leicester, the Cheviot, the Black-faced mountain sheep, and crosses of the Leicester with both of the latter breeds. I have not made any experiments myself on the proportion of mutton to the live weight in South-Down sheep; but I do not apprehend that there will be any difference between them and Leicester sheep in equal condition, excepting so far as the proportion may be affected by the difference in the weight of fleece.

The subjoined Table shows the proportion of mutton to the live weight of Leicester sheep—namely, when in the wool after Christmas, and in summer when recently clipped:

Live weight of Sheep in stone, 14 lbs. avoird.	Per cent. of Mutton. In wool.	Newly shorn.
Above 20	71 to 72	75
19 to 20	69 to 70	73 to 74
17 to 19	67 to 68	71 to 72
16 to 17	66	69 to 70
14 to 16	64 to 65	67 to 68
12 to 14	62 to 63	
11 to 12	60 to 61	64 to 65
10 to 11	59	
9 to 10	57	62 to 63
8 to 9	55 to 56	60 to 61
7 to 8	53 to 54	59
6 to 7	51 to 52	57
5 to 6	50	

* I say "permitting," because I would desire only to see the majority of the people of the South granting to the minority *the right to do what they like with their own*, and emancipate them if so disposed. I have no desire to see any interference with the right of property.

EXAMPLES.—The following were five extraordinary fat two-year-old Leicester wether sheep, fed by the Duke of Northumberland, and slaughtered by Mr. March, of Greensic near Gateshead, in the county of Durham, January, 1846:

		st.	lbs.	st.		st.	lbs.			st.	lbs.
1.	Live weight,	24	3	or 24·2142 ·72							
				17·434224	or, by table,	17	6	Actual dead wt.		17	6
2.	.. ..	22	12	or 22·8751 ·72							
				16·470072	..	16	6½	..	..	16	10½
3.	.. ..	22	0	or 22 ·72							
				15·84	..	15	12	..	..	16	1
4.	.. ..	21	6	or 21·4285 ·71							
				15·214235	..	15	3	..	..	14	4
5.	.. ..	19	11	or 19·7857 ·70							
				13·849990	..	13	12	..	..	14	3
						78	11½			78	10½

The quantities of tallow severally yielded by these five sheep were as follows, viz.:—Nos. 1 and 2, 1 st. 4 lbs. each; No. 3, 1 st. 2½ lbs.; No. 4, 1 st. 3 lbs.; and No. 5, 10½ lbs.: showing 1, 2 and 3, very good provers; 4, an extraordinary prover; and 5, but an indifferent prover. The fleeces of all of them were quite ripe.

The following was a two-year-old Leicester wether sheep, in fair condition, killed by Mr. Robert Story, of Newcastle-upon-Tyne, May 21, 1846:

	st.	lbs.	st.		st.	lbs.		st.	lbs.
Live weight.	9	3	or 9·2142 ·57						
			5·252094	or, by table,	5	3½	Actual dead weight,	5	2

The following was a ewe, half-bred between Leicester and Cheviot, killed by Mr. William Hawksby, of Newcastle-upon-Tyne, in April, 1846:

	st.	lbs.	st.		st.	lbs.		st.	lbs.
Live weight,	6	9	or 6·6428 ·51						
			3·377828	or, by table,	3	5½	Actual dead weight,	3	6

The foregoing examples are not selected particularly as a test of the accuracy of the scale of proportions laid down, as many instances can be given for such a purpose quite as close to the actual dead weights as those above; but as the particulars of the live and dead weights of the first five are recorded in the public prints, probably furnished by Mr. Patten, the Duke of Northumberland's agent (vide *Newcastle Journal*, May 16, 1846), they may be referred to; and as both the live and dead weights of the last are registered in the book kept at the public weigh-house, in the butchers' market at Newcastle, it is also an instance on public record. The examples given above will serve to show the application of the scale of proportion to *sheep of extraordinary weight*, to *those of a general character*, and also to *sheep of a very shabby description*. [The (London) Plough.

"EXPERIMENTS IN THE FIELD."—In the published proceedings of an Agricultural Association in England, attention has been drawn to the refuse matters of bleach-works, as well as to other waste materials; and experiments have been suggested for testing their value to the practical farmer. A letter has been received from Mr. Pringle, at Ingram Farm, near Lisburn, in Ireland, describing some interesting and successful experiments of this kind, in which the waste leys of a bleach-work were found very advantageous, in conjunction with farm-yard manure, in promoting the growth of turnips. The subjoined results are deduced from the statement in the letter, as having been obtained from the experiments tried:

	Bulbs.	*Tops.*
Dung alone	17 tons 5½ cwts.	8 tons 14 cwts. per acre.
Dung and guano	26 " 18½ "	8 " 1½ " "
Dung and waste leys	33 " 12¾ "	7 " 12½ " "

"The interesting difference in the weight of the tops, when the leys were used, appears to be connected with the large quantity of alkaline matter contained in the waste liquor; and, so far as the experiment goes, the liquid seems to influence the growth of the plant more in the bulb than in the leaf—a very important fact, if further trials should confirm it."

IMPROVED REAPER.

McCORMICK'S PATENT VIRGINIA REAPER, IMPROVED.

"Whatever a man shall sow, that shall he reap."

THE vast disproportion between land and labor, and the dearness of the latter, lead to a constant stretch of ingenuity to contrive, in every department, labor-saving implements. Our limits, too, seem to be extending yet faster than the increase of laborers, great as that is, by immigration and natural increase.

While this state of things continues, as it must do yet for half a century at least, we shall go on skinning district after district, and State after State, of their virgin fertility, just as the dairy woman passes along, skimming off the cream from pan after pan. Of most crops it is easy to, and too many do make more than they can harvest and take care of. It was, we may suppose, in view of this greedy and improvident disposition, that it was ordained, "Whatever a man sow, that shall he reap."

Some labor-saving implement has long been a desideratum for harvesting *wheat and grass crops*, particularly on the western prairies, where land is at once so cheap and so fertile. To meet this demand, Mr. OBED HUSSEY, of Baltimore, and Mr. McCORMICK, of Virginia, have been, we believe, most successful. In what consists the difference between their Reapers we are not exactly advised, and therefore not prepared to pronounce upon their comparative merits. We happen to know on good authority that Mr. Hussey's is in high repute among the working, and what is better, if better need be, the *thinking* farmers of brave "Little Delaware," and we shall be ready to make known its particular excellence, in any authentic way that he or his friends may enable us to do.

In the mean time, we have had placed within our reach the illustrations which follow, in proof of the availability and efficiency of McCormick's machine, which appear to commend it very strongly to all—of whom there are not a few—who find it much easier to sow than to reap. What is here given is taken at random from a variety of testimonials, equally particular and conclusive, contained in Mr. McCormick's hand-bill; and to these, thus selected from many, we append the statement of Mr. BATEMAN, of the Ohio Cultivator:

FRANKFORT, Clinton Co., Ia.,

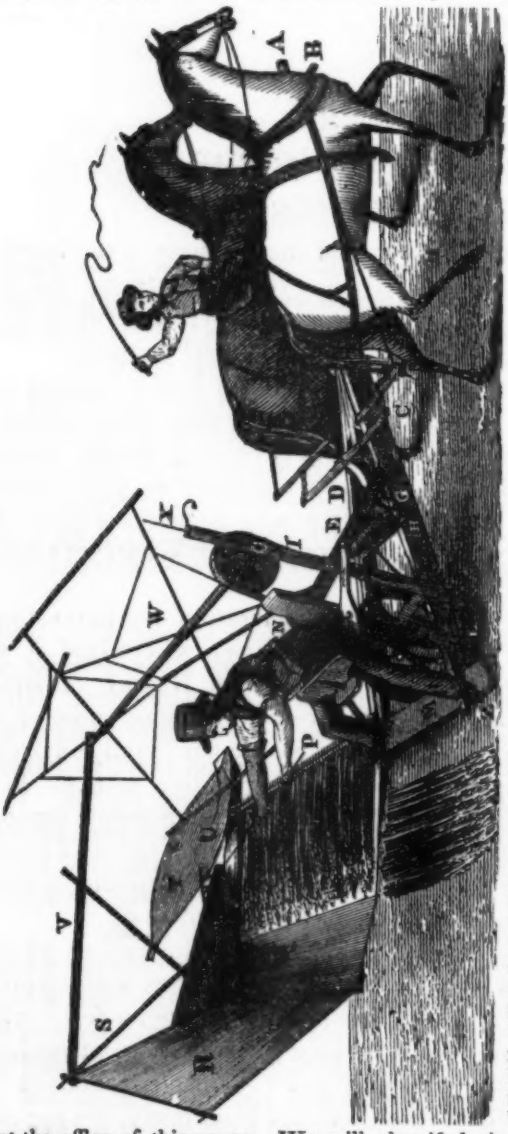
Dear Sir: I have used your Reaper about one-half the last harvest. I cut about 90 acres. The machine did not arrive until we were half done. My wheat was lodged, the ground rough and uneven. I have never before seen as much straw on the same quantity of ground. I can hardly conceive of more unfavorable circumstances than the "Reaper" was placed under, for a trial, yet the machine sustained its previous high reputation as a grain cutter. It performs well in standing grain, or in grain that is lodged. Two hands, one to drive and one to rake, will perform with the "Reaper" as much as eight hands could do with cradles, besides saving from a bushel to a bushel and a half per acre, that any cradler would leave on the ground. The machine is simple in its construction, and not liable, when properly made, to get out of order. If it should happen, any part except the sickle, to get out of order, there is no more difficulty in repairing it than a cradle or mowing-scythe. Yours, L. D. GRIGGS.

CYRUS H. McCORMICK, Esq.

DUPAGE, Will Co.,

Dear Sir: I take pleasure in communicating to you the result of my operations with your Reaper to the present time, which, I am proud to say, has been of the most satisfactory character. I cut, in nine days, with the Reaper, 150 acres of heavy wheat, since which I have cut 50 acres, and can say that the *work* was done *perfectly*, saving, I am satisfied, not less than a bushel

per acre; and this has been without any repairs or trouble with the machine. It would have required eight good cradlers to have cut my wheat in the time cut by the Reaper; and in addition to the cutting, the wheat was completely raked from the Reaper into gavels ready for binding.



In addition to the saving of grain and labor by your Reaper, it is worthy of remark that a very important consideration with the farmer is the cutting of his wheat rapidly and conveniently, when in a proper state for cutting, without being dependent upon hired labor, and thereby avoiding a very heavy loss from cutting either too early or too late. From these statements every farmer can make his own calculation as to the value of your Reaper. For my own part I consider it, to the Western country, the most important invention of the age, and that it will greatly increase the product of the country, not being able without it to reap so much as can be sowed.

Very respectfully, H. E. TOWNER.

P. S. The foregoing 200 acre completes my harvest of winter wheat, and I am now cutting my spring crop. H. E. T.

We take pleasure in announcing to our readers that Mr. McCormick has made such improvements in his Reaper as are found to greatly facilitate its operation, especially in the work of raking the cut grain from the platform, and that he is now engaged in manufacturing a large number of the machines at Cincinnati, for the supply of the South-western country. He assures us also that the utmost attention will be paid to the character of the workmanship in constructing the machines, so that no fault shall hereafter exist on that score.

From what we have seen of the operation of this machine, and the high testimonials from those who have used it extensively, we are confident that it will do first-rate work in good hands; and it will be seen from the advertisement in this paper that the terms of sale offer the fullest possible guaranty to purchasers. The need of machines for reaping grain was greatly felt by the farmers of Ohio last year, and we doubt not that a large number will be used at the coming harvest. Handbills giving fuller information, and testimonials of the character of the machine, can be obtained of Mr. McCormick, Cincinnati, or at the office of this paper. We will also, if desired, order the machine, for any of our readers who may wish to obtain them.

[Ohio Cultivator.

AGRICULTURAL EXHIBITIONS—IN WHAT WAY ARE THEY USEFUL?

THEIR value is to be measured not by the number of people in attendance, nor yet by the number of things exhibited; but by the new facts and valuable addition they bring to the *stock of agricultural knowledge.*

If mere numbers, and admiration, and excitement, be the object, let a militia mustering be advertised at any old field × roads, take care to have a drum and fife with a sprinkling of red coats, and swords, and things that smell of violence and blood. Add to these a dozen prancing stallions, a live bear and a ring-tail tame monkey—not forgetting to have booths for sale of mead and gingerbread, with a barrel of still-burnt whisky in the crotch of a cart-tongue, and the purpose will be fully answered. The throng will be as large as any one can desire, but how many will go away either better or wiser? The whole aim of Agricultural Associations should be to increase and diffuse knowledge, and *spectacles* should be encouraged only as they contribute to that end.

AGRICULTURAL ADVERTISER.

THE PLOUGH, THE LOOM, AND THE ANVIL.

VOLUME IV.

TO POSTMASTERS AND OTHERS.—PREMIUM OFFERED.

THE fourth volume of the PLOUGH, LOOM, AND ANVIL, commences with the July number, and now is the time to make up clubs. Any person sending *ten* dollars will have the magazine sent to five subscribers, whom he may designate, and an extra copy for himself, for one year; and get a copy of Von Thaer's great work on Agriculture, containing 550 pages. This is one of the best works ever published on the subject.

By sending *five* dollars, two copies will be sent for one year, and a copy of Carey's "Harmony of Interests" and Petzhold's "Agriculture." And *three* dollars will pay for a single subscription, and get a copy of Petzhold's "Agriculture."

Specimen numbers sent to any person desiring them.

Notice to Agents, Collectors, &c.

THOSE of our agents who have been collecting for the PLOUGH, LOOM, AND ANVIL, will please forward their statements and remittances to me, at the office of the P. L. and A., 79 Walnut street, Philadelphia, and go on collecting as usual.

R. C. THOMSON,
Administrator to the Estate of J. S. Skinner, deceased.

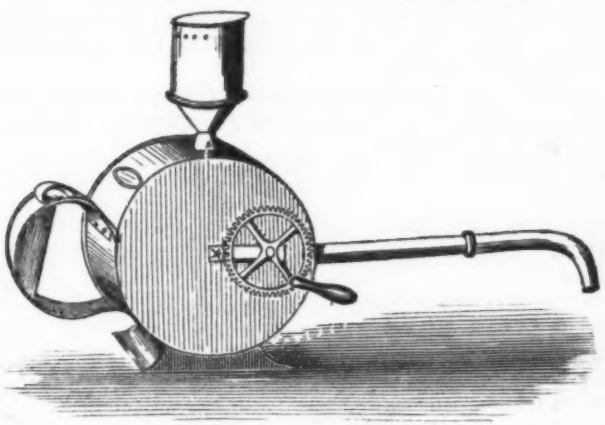
NOTICE.

Whereas, Letters of Administration to the Estate of JOHN S. SKINNER, deceased, have been granted to the subscriber, all persons indebted to the said estate, are requested to make immediate payment, and those having claims or demands against the said decedent, will make known the same without delay to

R. C. THOMPSON, ADMINISTRATOR,
79 Walnut street, Philadelphia.

BROWN'S PATENT

Patented in the United States, Sept. 24th, 1850.



FUMIGATOR,

A Portable Instrument for FUMIGATING GREEN HOUSES, FRAMES, DWELLINGS, SHIPS, CLOSETS, WARDROBES, SHRUBS, ROSES, AND OUTDOOR PLANTS, in the open air, without injury to the most delicate plant, delivering the Smoke cool, in a dense mass, and with the greatest safety in the hands of any operator. Manufactured and for sale by

R. BUIST,

NURSERYMAN AND SEED-GROWER,
Chesnut street, above 3d, Philadelphia.

Wholesale and Retail. ☞ *The trade liberally supplied.*

OPPORTUNITIES such as the one here offered so rarely occur, that all who desire a dip of the best blood of "Short-horns" to be had in any country, will do well to be in attendance personally, or by agent.—ED. P., L., AND A.

GREAT SALE

OF SUPERIOR

THOROUGH-BRED SHORT-HORN CATTLE.

THE SUBSCRIBER,

HAVING MORE STOCK THAN HE CAN WELL SUSTAIN ON HIS FARM,

WILL OFFER AT

PUBLIC AUCTION

About Thirty Head of his Improved Short-horn Cattle,

CONSISTING OF

BULLS, COWS, HEIFERS,

AND HEIFER AND BULL CALVES,

ON THE

26TH DAY OF JUNE INST.,

At his Farm, two and a half miles from this City,

(TROY, N. Y.)

It is known to breeders of improved stock in this country and in Canada, that the proprietor of this herd during the past twelve years has, through the medium of importations from England, and selections from the best herds in this country, spared no expense to rear a herd of cattle from which superior animals could be safely drawn for improvement and crosses upon other herds. His importations have been derived from that eminent breeder, the late Thomas Bates, Esq., of Kirklevington, Yorkshire, England; which herd, it is well known, has recently been disposed of at public sale by his administrators, and dispersed in many hands, and can no longer be resorted to as a whole for improvement.

The announcement of that sale created great interest, and all Short-horn breeders in England seemed emulous to secure one or more of these animals to mingle with the blood of their own herds; and at the day of sale, there was found assembled the largest audience ever before witnessed upon a similar occasion, numbering, as was said, four to five thousand persons, and among them the best breeders in England, and several from other countries, some of the animals bringing prices that seemed incredible to many.

In the herd now offered for sale will be included the imported Bull, Duke of Wellington, and the premium Bull, Meteor; these are Bates's Bulls, and their reputation as stock getters is too well known to need any comment. I am, however, authorized by Lewis F. Allen, Esq., of Black Rock, one of the most prominent breeders in this country, and who has had ample means of forming a judgment, to say, "that in no instance, to his knowledge, had these two Bulls been placed to short-horn cows of other herds previously imported into the United States, but what the produce was superior, in general qualities, to such herds."

The most of the stock which is now offered for sale have been bred from these two Bulls, and the proprietor having a young Bull, more remotely connected with that portion of the herd he retains, (being about fourteen in number,) can spare these two valuable Bulls. There will be in the stock offered for sale six young Bulls from about eight months to two years old in addition to the two named above, and the remainder of the stock will be composed of Cows, (most of them possessed of extraordinary milking qualities,) Heifers and Heifer Calves. It is believed that no herd of Short-horns has ever been offered for sale in this country exhibiting more of the valuable combinations of qualities which contribute to make up perfect animals.

A Catalogue containing the pedigrees of these animals will be ready for delivery at an early period, in which the terms of the sale will be particularly stated. A credit will be given from six to eighteen months.

Gentlemen are invited to call and examine the herd at their convenience.

GEORGE VAIL.

Troy, N. Y., February 15th, 1851.

DOMESTIC ANIMALS AT AUCTION.

THE POSTPONED YEARLY SALE OF

FULL-BRED SHORT-HORNS,

AND

IMPROVED DAIRY STOCK,

Consisting of about FIFTY HEAD, will come off at my FARM,

ON

TUESDAY, JUNE 24th, 1851,

AT 12 O'CLOCK, M.

I shall dispose of all the improved Dairy Stock, which is composed of the finest Short-horn, with a slight cross of Amsterdam Dutch, which some writers say was part of the original ingredient which composed the improved Short-horns.

I am now breeding the Short-horns, Devons and Ayrshires, each separately and pure, which, owing to the limits of my farm, make it necessary to confine myself to those three breeds. By the awards of the State Agricultural Society, the American Institute, and my own County Society, (with the exception of last year, when I was not a competitor at either,) it will fully appear that I have been a very successful exhibitor. The cow which won the First Prize as a milker, at the American Institute last year, was bred by me, and composed of the above alluded to Dairy Stock. Several of the Bulls got by Lamartine will be of the most appropriate age for efficient service the coming season. All Cows and Heifers old enough, will be warranted in calf at the day of sale, by my Imported Bull "Lord Eryholme," or my celebrated Bull "Lamartine."

I own two thorough bred Devon Bulls; one the celebrated old Major, the other, one and a half years old, imported by me from Devonshire. One of the above animals will be sold—which, I have not as yet determined.

A full Catalogue, with the pedigree of each animal, will be published in due time, with minute description of sale, &c.

I also have a number of Suffolk Sows, in pig to my imported Boar, most of the progeny of which will be old enough to dispose of on that day.

I also have about 20 South Down Ewes, most of which I imported from the flock of Jonas Webb, and now in lamb to my imported Buck "Babraham." Some of their Buck Lambs will be offered at auction on that day.

This sale will not only offer an opportunity to obtain Stock from my previous Herd, but will also enable persons to procure calves from my imported Bull, lambs from my imported Ram, and pigs from my imported Boar—all of which animals were recently selected by me in person, when in England.

The mode of warranting the Cows and Heifers in calf, is this: in case they prove not to be so, it shall be optional with the purchaser, on his *certificate of that fact*, either to receive from me $25, (say twenty-five dollars,) or to send the cow to my farm, and I will keep her the proper time (free of expense) to have her got in calf to either of my Bulls, which he shall choose. I will give $25 for any heifer calf from either of the Cows or Heifers sold at the sale, delivered on my farm, at two weeks old.

Stock purchased to be sent a distance, will be delivered on shipboard or railroad in the city of New-York, free of risk or expense to the purchaser.

Persons living at the South, in a climate to which it would not be well that stock should be transported, at that hot season of the year, may let such animals as they may purchase remain with me until the proper season, and I will have them well taken care of, and charge only a reasonable price for their keep. One of my objects in breeding improved domestic animals, is to assist in distributing them throughout the Union, deeming it one, if not the most important feature to promote profit to the cultivator of the soil, and to benefit the consuming country at large.

All communications through the Post please pre-pay, and I will pre-pay their answers, and also a Catalogue if required. Catalogues will be to be had at all the principal Agricultural Warehouses and offices of the principal Agricultural Journals, on and after the 1st day of June next. Persons wishing to view the stock at any time will find my superintendent, Mr. Wilkinson, to give them the desired information when I am not at home.

Dated this 4th day of March, 1851, at Mount Fordham, Westchester County, eight miles from the City of New-York, by Harlem Railroad. L. G. MORRIS.

P. S. I decline selling any Stock by Private Sale, so as to offer the Public all the Animals I have to part with without having any previously selected from the Herd, and all Animals offered will be positively sold. April 1.—3t.

PENNOCK'S PATENT SEED AND GRAIN PLANTER.

FOR PLANTING

WHEAT, RYE, BARLEY, INDIAN CORN, RICE, OATS, BEANS, PEAS, RUTA-BAGAS AND TURNIPS.

This machine can be regulated to drop any quantity per acre, at whatever depth required, and operates equally well on all kinds of land. It is so constructed as not to be injured by coming in contact with rocks, roots, &c. For simplicity, durability, and economy, it is unsurpassed by any other agricultural implement in use.

Price $100. A liberal discount allowed to Agents.

READ THE FOLLOWING.

Previous to harvest, we had five acres carefully measured with the chain and compass by W. Pennington, the surveyor of the neighborhood, assisted by John Jones, who saw it all cut, threshed and measured separately, with the following results:

Nos. 1 and 2.—Two acres of broadcast surveyed together—two bushels of seed to the acre—seventy-five shocks—fifty-five bushels of wheat, or twenty-seven and a half bushels to the acre.

No. 3.—One acre drilled, adjoining the above, the land, if any different, rather inferior; treated exactly alike—one bushel and one peck of seed to the acre—forty-two shocks, thirty-five bushels.

No. 4.—One acre drilled a little distance from No. 3, one bushel and one peck of seed, forty-two shocks, thirty-five bushels to the acre.

No. 5.—One acre drilled a little distance from No. 4, one bushel and one peck of seed, fifty shocks, forty bushels to the acre.

Here we see that by the use of the drill alone, (the soil being in the same, or perhaps an inferior condition,) the crop was increased seven and a half bushels per acre, and adding the amount saved, (three pecks,) make eight bushels and one peck to the acre; and further, that the amount of straw to the drilled acre, with a smaller quantity of seed sown, increased twelve per cent., and the amount of grain on the same acre was increased more than twenty-seven per cent. * * * The drill used was invented by M. PENNOCK & SONS, of Kennet Square, Chester County, Pennsylvania.

Respectfully, CHARLES NOBLE.

Philadelphia, 10th Mo., 1844.

Unionville, Chester Co., Pa., Feb. 8th, 1848.

I do hereby certify that I have used one of Pennock's Patent Drills for five years, and have put in from fifty to seventy acres of wheat for myself every year since, and have never failed having a good crop. I think I can safely say that I have realized from 30 to 50 per cent., or that it has averaged me from $300 to $400, and even $500 a year over the usual broadcast seeding. My land being low, I have lost greatly by the winter throwing the roots entirely out, which is wholly obviated by drilling. I would not take $500 for my Drill if I could not get another of the kind. JOHN HUEY.

Reedville, Mifflin Co., Pa., July 21st, 1848.

I hereby certify that, previous to harvesting, I measured one acre of wheat carefully, as follows: half an acre which had been drilled in with one of your machines, one and a quarter bushels of seed per acre—also half an acre broadcast, from one and three quarters to two bushels of seed per acre; and when cut and threshed, measured as follows: the half acre drilled wheat, thirteen shocks, measured twelve bushels and two quarts; the half acre broadcast, eight shocks, measured seven bushels eighteen quarts. The quality of the land exactly alike, and treated alike previous to sowing the seed.

ABNER THOMPSON.

We, the undersigned, were present, saw the land measured, cut the grain, and assisted in threshing the same, and believe the above statement to be correct.

JAS. REED, ALEXANDER REED,
H. G. MORRISON, WILLIAM STEELY,
D. C. MILLER, GEORGE ASHBY.

Shirly, Va., Nov. 5th, 1849.

MESSRS. S. & M. PENNOCK: * * * * I have used your Patent Seed Drill, and do consider it the most simple and perfect, as well as the most complete labor-saving machine I ever saw. It does the work in our lower James River county, of 14 harrows, 12 horses, and 5 good men—(one of them a good seedsman)—with only 3 harrows and 2 smart boys. I am determined to have two of your Drills by next season if possible. * * * *

Most respectfully, yours, &c., HILL CARTER.

The subscribers manufacture, and keep constantly on hand, the above machine, together with a general assortment of agricultural implements, such as Ploughs, Horse Powers, and Threshers, Hussey's Reapers, Horse Rakes, Corn Shellers, Fanning Mills, &c. Also, Pennock's Improved Lever Jack, for raising carriages and wagons; together with steam engines and mill work of every description.

Having an Iron Foundry in successful operation, they are prepared to furnish castings of superior quality at short notice. S. & M. PENNOCK.

Kennet Square, Chester Co., Pa.